Electrical Review

Vol. 78—No. 23. CHICAGO, SATURDAY, JUNE 4, 1921. Page 887.

Central Stations Lead in Showing Spirit of Progress

N.E.L.A. Convention Thrilled by Words of Prophet and Worker Who Points Out Immense Possibilities of Interconnected Power Plants and Super-Power Zones in Many Sections of the Country

By SAMUEL INSULL

President, Commonwealth Edison Co., Chicago.

I cannot refrain from referring to the general condition of our business following the terrific strain imposed upon it by the great war. Even as late as a year ago, many financial authorities looked more or less askance at a business that, on the cost side of it, is governed by the ordinary laws of supply and demand, but on the selling side of it is ruled by governmental agencies that establish the prices at which we shall sell our product to the public. But the last 6 or 9 mo. has brought about a very great change in the point of view of financiers and investors. You can scarcely read the financial column of any daily newspaper without finding a record of dividends passed by industrial institutions in more or less troubled waters, and, in fact, of the wiping out of capital that is appalling.

On the other side you see an industry that has been taxed to its limit so far as its cost is concerned—cost of operating and cost of money—yet in 6 or 8 short mo. getting back to its own and getting ready for the time when the financial clouds roll by, and when we can look forward to a more stable condition of business generally throughout this country.

Now, the fundamental cause of that is the inherent financial strength of the central-station business. You take almost any form of manufacturing business and a very large portion of its capital is necessarily tied up in finished material, material in course of manufacture and but a relatively small portion of its capital is tied up in permanent plant. It is not at all surprising that many of the great industrial institutions of the country have during the year 1920 found themselves not only on the wrong side of the ledger so far as 1920 was concerned, but many of them had the unpleasant experience of having their entire profit of the war period practically wiped out, the reason being that such a large portion of the money involved in their business was tied up in accounts that were subject to very rapid depreciation, as prices went down and as credit was impaired, whereas we are engaged in a business that, if our entire accounts receivable and our entire merchandise on hand were wiped out, it would not produce a greater effect upon our permanent capital investment than from 10 to 15%.

Another reason for the rapidity with which our business has come back is the fact that we are engaged in a business that has not reached a point of saturation, and are not so much governed by the ordinary laws of supply and demand as some of our friends in other forms of public-utility business are engaged in, where the point of saturation has been more nearly reached; as, for instance, the street railroad business, the water business and the gas business. Therefore, when hard times come along the main effect on us is a reduction in the percentage of increased business. It would take a long period of depression to put the electric light and power business in a position where its actual business, taking the country as a whole, would show a decrease in output as compared with the previous year.

Revival of Business-Getting Departments Now Necessary.

For several years past our trouble has been to provide the necessary plant and equipment to take care of the business offered and many of us have during that period practically disbanded our business-getting departments. That time has passed now, but you may be at this particular moment, or will be during the coming winter, somewhat harrassed for lack of capacity, if the present depression in business is to be continued. If it is to continue, my advice to you is to get busy with your business-getting departments and try to avoid one of the troubles of the gas business, and of the street railway business at this time—try to avoid getting in a position where your monthly receipts, as compared with the same month of the previous year, will show in the red so far as increase is concerned.

The universal use of our product of electrical energy means great diversity, and consequently high load-factor. If you will study the figures put out from Washington you will find that instances where the load-factor is the greatest are in parts of the country where the use of our prod-

uct is the most universal. You might find specialized cases like Niagara Falls, devoted very largely to the use of power in industries requiring 24-hr. service, but, studying the load factors of the various operating companies and the various territories, you will find big load-factor, high load-factor, say, along the Pacific Coast where owing to local conditions the cheapest form of power for general purposes is that obtained from the waterfalls of the Sierra Nevadas; or take a similar case in the state of Montana where practically all the power used comes from hydroelectric sources.

A cursory examination of the Montana situation might lead you to the conclusion that the conditions there are brought about by the fact that a considerable amount of power is used for railroad purposes. But a close examination of the situation will show that that is only one of the factors, and that a 78% load-factor, and a 2000 kw. per capita, is brought about by the universal use of electrical energy. And, as I said, the same conditions exist on the Pacific Coast where, say, the load-factor averages about 60% and the kilowatt-hour output per capita averages about 1200.

Consideration of Energy Distribution in Large Centers of Population.

Now then, take another class of business; the distribution of energy in large cities where intensive work has been done to provide the necessary customers and where there have been, over a long period of years, some differences in policy, not so great today but very marked 10 yrs. ago, with relation to the wholesaling of electrical energy on a large scale.

Take the case of New York City. It has a load-factor of about 40% and a per capita sale of about 450 kw. Then, take Chicago. It has a load-factor of about 45% and its kilowatt-hour distribution per capita is about 700. The difference there of practically 12.5% in load-factor is owing to the fact that in Chicago practically all of the energy produced for use within the city is produced under one organization.

Those various percentages would hold good in all territories surrounding large cities of the country, dependent somewhat on the nature of the business offering and of the character of manufacturing conducted. About 10 yrs. ago I was discussing this subject before the American Institute of Electrical Engineers in New York City. I pictured the possibility of connecting up not only Greater New York, but New Jersey and the territory immediately tributary to New York. I spoke of the possible results if all the electrification of steam railroads going on in that part of the country, and the great industrial businesses of New Jersey, were coupled up with the smaller manufacturing businesses of New York, and all of the great residential territory in the surrounding Greater New York were all one system.

If that were done you would find practically the same figures so far as load-factor is concerned, that exist on the Pacific Coast and in and around New York. If added to that were general electrification of the steam railroad terminals centering in and around New York bay, you would probably have load-factor conditions comparable with those which exist in the state of Montana today.

(Here Mr. Insull presented on the screen a map of the territory surrounding Chicago to show the extent to which transmission lines have been built and the territory connected up.)

The development that has gone on in this Chicago territory is a fair example of what is going on through the whole Mississippi Valley and the Rocky Mountain country wherever connecting up of separate systems is justified by the financial results. To express it in a few words, the territory from St. Paul and Minneapolis on the north, to St. Louis and Louisville on the south is connected up today practically in one system, with the exception of about 115 to 120 mi. in three separate gaps where the connection has not been made, partly because of the cost in money and partly because at this particular moment the financial advantages to be obtained are comparatively slight.

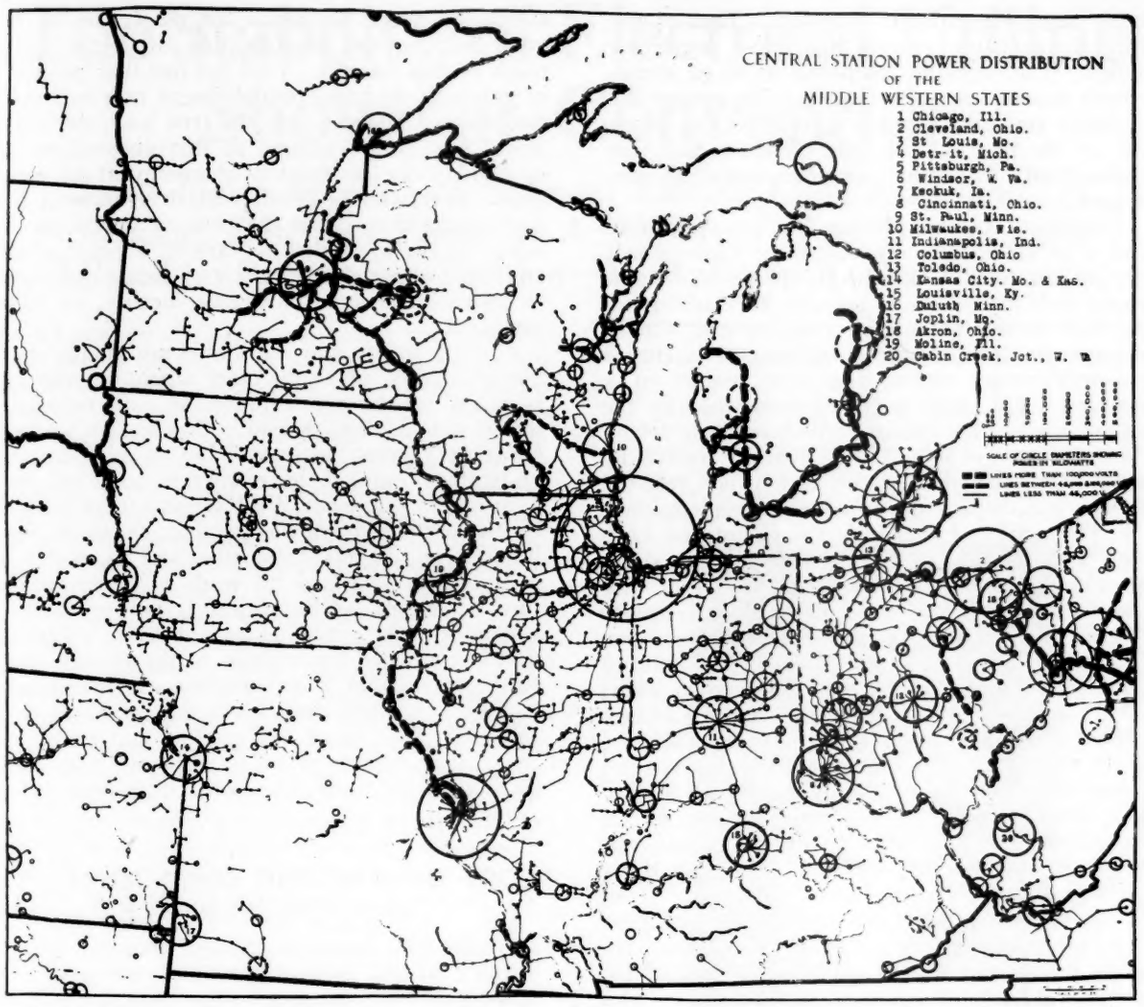
Today we stretch across the state of Illinois to Keokuk, Ia., on the west, to Terre Haute, Ind., on the east—there is a general flow of energy partly obtained from water power, partly obtained from stations at the pit mouth and partly obtained from stations well located as to transportation and water supply. That energy is supplemented by other hydroelectric and steam developments—goes a little east across the state of Indiana to Indianapolis and then follows down the backbone or center of that state to Louisville. With one development in central Kentucky that line will be continuous as far as Cincinnati.

On the other side the power of the Keokuk dam is carried on down to St. Louis and the steam stations of St. Louis act as a steam reserve to the hydroelectric development at Keokuk. That situation is not peculiar to that particular territory. If you go up into Wisconsin, in practically the center of the states, you will find hydroelectric development that feeds Milwaukee, that feeds northern Illinois to a slight extent, and at this time we are contemplating building at Waukegan, Ill., a little north of Chicago, a large power station on the lake which, while taking care mainly of the territory immediately north of Chicago and supplementing the small water power and steam stations on the various rivers of northern Illinois, will practically act as a steam reserve across to the Mississippi river and up into central Wisconsin.

Possibility of Super-Power Zone Development in Many Places.

The possibilities of this Chicago territory are mentioned because of the recent wide-spread publicity given that super-power scheme along the Atlantic seaboard, occupying a small amount of territory but having great wealth, great manufacturing capacity and a great population, extending, say, from Portland, Me., to about Baltimore. What is possible on the Atlantic seaboard is possible here in the Middle West, and also in many other sections of the country.

Take the situation with which I am naturally more familiar—and that is my excuse for referring to Chicago—in order to obtain a proper combination of transportation facilities and ample water supply which cannot be affected by anything except absolutely natural causes, the central station must be located on Lake Michigan. Looking at the advantageous location of Chicago,



Map of Middle West Power Distribution Territory With Center in Chicago, Showing Possibilities for Great Super-Power Zone.

Mr. Insull used a lantern slide made from this map, which he said was originally prepared by W. L. Abbott, of the Commonwealth Edison Co., and used by Mr. Abbott in an address he delivered recently before a meeting of the American Society of Mechanical Engineers.

it is probable that this will be the center of the greatest industrial activity in the country—the center of population, of intensive manufacture and of wealth—due to electrical development.

Now you can find that situation in a great many different parts of the country. You can't all of you build 100,000-kw. stations. You are not all of you fortunate enough, and I may say on the other side of it sometimes unfortunate enough to be in control of the business in a great central population, but whether you build a 1000-kw. station or a 5000-kw. station or a 10,000-kw. station, and I presume in your planning you will plan whatever is most desirable, and the largest for which you have the funds to plan and the financial facilities that are back of you to build; whatever you build, build it so that it is the most economical of its kind so that when the day comes that this country is gridironed by transmission lines just as it is gridironed today—to use the expression of Professor Steinmetz—by the railroads, that you can dump your energy into that system continuously and as cheaply as energy within easy reach of you can do the same thing.

I know of no greater mission that this Association can perform than in bringing home to the representatives of all our smaller company members to see to it that the location is right, that there is ample water power that nobody except the Creator can interfere with, that the transportation facilities are the best that you can get in the neighborhood; and also see to it that you have a class of engineering that means permanency of the investment and low cost of production.

The map previously referred to represents Illinois, Indiana, portions of Michigan, Wisconsin, Ohio, Keokuk and St. Louis. With practically the same population it produces about the same kilowatts, burns 13% more coal because of the lower efficiency of the fuel, and produces 40% more energy from water power than is produced in the territory of the proposed eastern super-power scheme. We have not called it by the same name, but we have been actually doing the same work that it is proposed should be done on the Atlantic seaboard. We have some advantages. We have possibly more enlightened legislation on the subject. The question of condemnation under the law of eminent domain is accorded us to a greater extent in the territories of the Mississippi valley than is accorded in the terri-

tories along the Atlantic seaboard. That to my mind is probably one of the most important things. The necessity compelled us to go ahead. I have had to learn the fact that the greater the territory you can cover the greater is the diversity of the demand for your product, and that consequently the better are your operating conditions.

President Harding during the late campaign had a good deal to say about the Government having too much to do with business. We ought to see to it that heads of bureaus in Washington, in their efforts to enlarge their sphere, should not get such a hold on our business as to curtail its development during the next quarter of a century. We ought to profit somewhat by the experience of the English, who have been trying for years to get out of the situation created by the Chamberlain Bill in the '80s, which resulted in the establishing of 61 different undertakings for the supply of energy in the County of London and resulted in the territory of 7,500,000 people using less energy than in the city of Chicago with 2,500,000 of people, and at a cost to the user in the County of London greater—that is, the bare cost of production, without interest or anything else—greater than the average selling price of the same product in the city of Chicago. Those are things we ought to guard against.

If the entire railroad system of this country were electrified it would only use 15 or 20% of the total electrical energy requirements of the country. It would seem to me ridiculous, and there is always the possibility of such a thing, for the steam railroads of this country to dictate policy so far as power production and distribution are concerned, as it would be for the electric light people and the electric power people of this country to presume to dictate policy as to what should be the charges for and the methods of transportation in this country.

I feel somewhat strongly on this subject because I think involved in it is our future progress. There may come a time when we may be in so unfortunate a position, and when our business has grown as it is rapidly growing to be an interstate business instead of municipal and state business, when we may have to appeal for Federal protection because of the asinine course pursued with relation to the regulation of our business in some portions of this country where the fulfillment of political pledges is considered of greater consequence than the conduct of a business on an economic and truly financial basis. I will regret such a time, but assuming that it will take place, and assuming that we are going to continue to develop our business on the lines that we have so far developed it—extending the load to take every form of customer whether it be a steam railroad or isolated plant—I question very much whether in the Chicago switching zone the railroads would use more electrical energy than would be used by supplying those people who have isolated plants at this time, and there are relatively few isolated plants in this territory in proportion to the energy put out.

Now I would like to see every committee in this Association that has the right to act in this matter, be on the alert. I would like to see the Public Policy Committee and any special committees, watch the progress of any plans of Federal control of our business. I think we can be of great help in the rehabilitation of steam railroads of this country. I am not one that believes in universal electrical propulsion of railroads immediately. I believe that the true way, the economic way to get around to that proposition is to develop our production of energy along economic lines, and to develop the transmission of that energy throughout the country on economic lines; to see to it that we are in a position at any time where electrification of steam railroads is desirable in some particular locality, to take care of it.

I see no reason why we should not finance that operation right up to the point where our energy is taken by the prime mover of the railroad; that is, the locomotive, and in that respect we can be of very great assistance; but in all these investigations—and I have studied some of the figures sent out from Washington—there should be the stabilized knowledge that exists in this industry and in this Association and its members as the result of 40 yrs. of work in the manufacture of energy. The nation is entitled to the benefit of it, the industries are entitled to the benefit of it and we are entitled to the benefit of it to the extent that it will stabilize our investment to a greater extent than it is today, and will help to reduce the cost of our product and enable us to sell it at cheaper prices to all of our customers as well as to those who want it in very large quantities.

COST OF MELTING COLD METAL IN ELECTRIC FURNACE.

When cold metal is charged into an electric furnace, unless carefully handled, there will be considerable fluctuations in the current until the pigs or pieces of scrap around the electrodes are melted. As the rest of the charge melts in the bath that forms, the fluctuations become less marked and when the bath is entirely molten the internal resistance is sufficient to reduce the current demand, in some furnaces, one-half. Melting cold iron ordinarily requires a big current reserve and a higher current cost. Data from steel melting show that melting cold stock consumes up to four-fifths of the total current used, the refining period takes the other fifth. Since, however, refining is going on while melting progresses, the contrast in reality is not so great. Duplexing is not only cheaper but it is also faster, for melting a cold charge and refining it in the electric furnace might take 2 hours, whereas the refining period after melting would not reach ¾ hour.

The advantage of the melting from cold metal system over duplexing lies in the ability to melt whenever desirable, whereas duplexing is dependent on the running time of the cupola. The higher cost of castings by either method, unless the lower grade materials used make up this difference, means that the electric furnace will only be used where quality work is produced. Thus, if the total cost of work is, say, 3 cts. per lb., it is not likely that the foundryman will add another ½ to ¾ ct.; but for work that costs 15 cts. per lb. this addition matters little. The maker of grate bars will undoubtedly stick to the cupola, whereas the producer of piston rings is already beginning to use the electric furnace.

The Stability of Electrical Utilities Shown at Convention

Forty-fourth Meeting of National Electric Light Association in Chicago Discloses Plans for Ambitious Future Development Based on Present Safe Position—M. R. Bump Elected President

Electric public utilities no longer fear financial disaster as the result of an unresponsive or antagonistic public; the public is with them and a market for electric light and power securities has begun to supply the funds required to develop the gridiron of transmission lines interconnecting great central stations in super-power zones over the face of the continent. This and more great possibilities for the immediate future of the electrical industry was disclosed at the 44th convention of the National Electric Light Association in Chicago May 31-June 3.

When the Association met in California a year ago its members were confronted with the problem of placating an antagonistic public and obtaining funds for the very existence of many of the central stations. The progressive spirit of co-operation that caused the utility people to carry their case to the people through good-will campaigns, resulting in a turning of the tide of sentiment in their favor, was manifest throughout the convention—and this convention was the largest in point of attendance and accomplishments in the history of the Association.

Following the most comprehensive and instructive program of the convention the election of officers resulted in the following well-chosen personnel for the ensuing year:

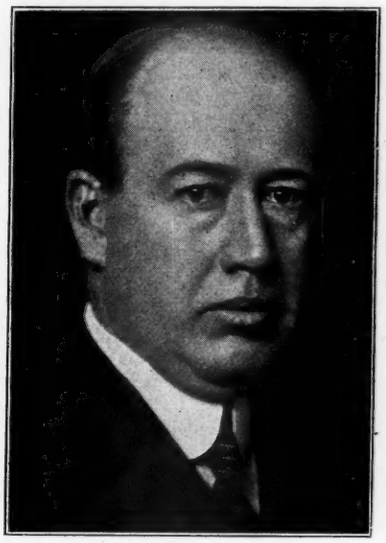
President, Milan R. Bump, of Henry L. Doherty & Co., New York City; first vice-president, Frank W. Smith, of the United Electric Light & Power Co., New York City; second vice-president, Walter H. Johnson, of the Philadelphia Electric Co., Philadelphia; third vice-president, Franklin T. Griffith, Portland Railway, Light & Power Co., Portland, Ore.; fourth vice-president, J. E. Davidson, Nebraska Power Co., Omaha, Neb.; treasurer, H. C. Abell (re-elected), American Light & Traction Co., New York City; members-at-large of the National Executive Committee, R. F. Pack, Northern States Power Co., Minneapolis, Minn.; I. E. Moultrop, Edison Electric Illuminating Co. of Boston; E. W. Rice (re-elected), General Electric Co., Schenectady, N. Y.; E. W. Robertson, Robertson-Cataract Electric Co., Buffalo, N. Y., and Rawson Collier, Georgia Railway & Power Co., Atlanta.

The newly elected president paid high tribute to Martin J. Insull for his wonderful work during the past year, announcing that Mr. Insull had accepted the important post of chairman of the Public Relations Committee for the coming year. President Bump pledged his best efforts toward carrying out the task of the Association to try and convince every man, woman and child in the country during the coming year that the electrical industry desires most to serve their needs.

At the opening session of the convention there

President-Elect of the National Electric Light Association.

After 4 yrs. service as a vice-president of the National Electric Light Association, and following many years' interest and activity in the affairs of the Association, Milan R. Bump was elected to the presidency at the Chicago Convention at the Drake Hotel, June 3. At present he is chief engi-



Milan R. Bump.

neer of Henry L. Doherty & Co. in charge of all engineering and of the construction and operating departments of the public utility division. He is also a member of the executive committee of the Doherty organization in charge of oil transportation, refining and marketing divisions and the natural gas division.

Mr. Bump was born at Rock Falls, Wis., March 18, 1881, and was graduated from the University of Wisconsin with a degree of B. S. E. E. Shortly after his graduation he became affiliated with the Washington Water Power Co., of Spokane, Wash., as assistant engineer, later becoming engineer of the Denver Gas & Electric Light Co., 1904-1906; then examining engineer of Henry L. Doherty & Co., 1907-1909; then general manager of the Empire District Electric Co., Joplin, Mo., 1909-1910, and since that time chief engineer of Henry L. Doherty & Co. In 1909 he married Miss Mary Morrison, of Joplin, Mo. They have three children. His present residence is at Montclair, N. J. He is a member of National Electric Light Association, American Gas Association, American Electric Railway Association, American Institute Electrical Engineers, American Electrochemical Society, American Petroleum Institute, Society for the Promotion of Engineering Education, New York Electrical Society, Tau Beta Pi Engineering Fraternity, Doherty Men's Fraternity, Engineers' Club, New York; Toledo Club; Montclair (N. J.) Golf Club, Doherty Men's Club, New York and Washington.

were received a number of telegrams of greeting and felicitation from men prominent in the industry, among them Charles F. Brush, Cleveland, and Thomas A. Edison.

Optimism and enthusiasm of the members found a tangible base in the addresses of James A. Perry, president of the National Association of Railway and Utility Commissioners, Atlanta, Ga., and Edward N. Hurley, president of the Hurley Machine Co., Chicago. Mr. Hurley, who was formerly chairman of the U. S. Shipping Board and the Federal Trade Commission, spoke on the subject, "Do We Know Our Customers?" Mr. Perry, in speaking on the subject of "The Public's Interest in Utility Development," harshly condemned the practice of politicians in inciting the public against utilities for personal aggrandizement, and urged that the electrical utilities carry the truth to public direct and thus confuse the agitators and despoilers of both the utilities and the people they presume to represent.

The address of Samuel Insull, which appears elsewhere in this issue of ELECTRICAL REVIEW, carries the keynote of the convention and depicts the facts for which the National Electric Light Association has good reason to glory in the achievements of the past year and to go forward the next few years with a definite program of high progressive development.

W. S. Murray, chairman of the Super-Power Zone Commission, assured the National Electric Light Association that the Government had indicated no intention of assuming charge of power developments in the Eastern Super-Power Zone. He stated that the sentiment was with the utilities and that the developments made as the result of the Government's survey could best be financed and operated to the greatest advantage by the public-utility companies.

William L. Goodwin, whose appointment as general manager of the Society for Electrical Development became effective June 1, was in attendance at the convention and lent his wisdom and experience to the counsel of other veterans of the industry. Mr. Goodwin advocated the standardizing and simplifying of elementary terms and definitions in the electrical industry for the benefit of the general public so that people would no longer be mystified and kept in ignorance of such things as tend to curtail their use of appliances.

"Whether the responsibility of the public utilities shall be taken over by the Government or by municipalities depends on how well they are conducted," said Mr. Goodwin. "The position of the utilities will be maintained so long as they give the public the right service. Our great need today is to sell electricity to the electrical industry so that, from the highest man to the lowest employe, they can sell it to the public."

General and Executive Sessions

The first General and Executive Session of the National Electric Light Association was convened by President Martin J. Insull who, following the reading of an address of welcome from the mayor of Chicago by James W. Breen, corporation counsel, delivered his annual address.

Millions Required to Meet Immediate Electric Power Requirements.

Martin J. Insull, president of the National Electric Light Association, opening the annual convention of the Association, said:

"It is estimated that for the next 5 yrs. the electric light and power industry will require, to provide for the demands that will be made upon it by the public, approximately $1,000,000,000 per year. This sum will be spent for the necessary steam and hydroelectric generating equipment and transmission and distribution system with all the appurtenances necessary to give service. Put into figures that may be more easily appreciated, approximately $3,000,000 every day or $125,000 every hour for the next 5 yrs. must be provided and used for the public benefit. If it cannot be provided the public will be the sufferer.

"Under our regulatory laws, after paying all our operating expenses and providing depreciation we only have left a fair return upon the actual amount of money invested in our properties for the public use. After paying a return to the people that have invested their money in the industry there is comparatively little left for further expansion such as we have been contemplating. It must come from the investors who are that part of the public that are thrifty and willing to invest their money in our industry because of their belief in its stability and safety.

"One part of the public loans to or permanently invests its money in our industry for the benefit of all the public so that it may be furnished with the facilities so absolutely necessary to the country's business and social development. Their only direct reward is the wages of capital—a reasonable return on the investment. Their indirect reward in which they share with every one comes from the general improvement in both the business and social conditions of the country. It is our duty to see that this money is judiciously spent on property that can be economically and efficiently operated, and to plan to bring to the properties such different classes of business as will give the greatest return on the dollar invested.

"On entering this period of vast money requirements we should give this question of our public relations the most careful consideration, as upon this very largely depends our ability to successfully take care of the anticipated requirements of the public. Under present regulatory conditions the public, through the representatives, determine the class of service we shall give, the rates we shall charge and the securities we shall issue. These representatives cannot help but have their judgment more or less affected by public opinion. The investor would be more easily attracted to our business, which is one affected by a public interest, if he knew that it had a generally favorable public opinion.

"There is much to be done. The innumerable small uneconomical central stations scattered over the country must be displaced by a smaller number of large economical modern generating plants all

ultimately feeding into extensive transmission and distribution systems covering large areas. Millions of homes and hundreds of thousands of manufacturing establishments are waiting to receive the benefits of electrical energy. While a considerable portion of this energy must necessarily be transmitted from steam-driven generating stations, a large increase in hydroelectric developments may be confidently looked forward to in the future.

"During the past year laws have been passed that make possible the development of the water powers on the public domain and in our navigable streams. In the Federal Power Commission is the machinery for the operation of these laws. This Commission has so far issued permits for the development of 2,000,000 hp. of hydroelectric energy out of total applications on file for 15,000,000 hp., which about equals the total power now estimated to be used by the electric light and power industry. The development of these water powers naturally falls upon our shoulders.

"The day of municipal control of utilities has gone and we are in the period of state control, with the possibility that in the time of many of us here we shall have reached the stage where, due to further developments, interstate control may become advisable. With the passing of the period of municipal regulation there has necessarily largely passed the day of municipal ownership. The public must be informed that the only way by which the medium-sized cities and the smaller communities can be provided with efficient electrical service at reasonable rates is by the massing of the production of energy in great central stations located where their energy can be generated at the lowest cost and transmitted from there over large areas of distribution."

Abstract of Enthusiastic Report Presented by Executive Manager Aylesworth.

In a comprehensive report that brought unanimous expressions of satisfaction and commendation, Executive Manager M. H. Aylesworth said, in part:

"Accomplishments of the past year have been very gratifying indeed. Work begun under the inspiration of President Ballard has been augmented and carried on so vigorously by President Insull that it is hard to believe so much could have been performed in so short a time. The result has been tremendous progress toward satisfactory alleviation of trouble caused by inductive interference, toward close co-operation between all branches of the electrical industry, toward the adoption of a uniform classification of accounts, toward securing rules and regulations which by their reasonableness will invite investors of the nation to extend a helpful hand in its electrical development, and toward better public relations and a fuller public understanding of the problems of the electric light and power industry.

"Invitations extended to your executive manager and other representatives of this Association by the National Association of Railway and Utility Commissioners and the Investment Bankers' Association of America to appear before these organizations, have promoted better understanding between the investor, the regulator and the electric light and power company, all in the interests of efficient service to the general public.

"There has resulted from the year's work a greater Association with broadened activities and more effective national influence. This was made possible by the machinery set in motion immediately prior to and during the 43rd convention of the Association at Pasadena, Cal., last year. At that convention a plan was crystallized calling for increased activities along many lines, including not only those of the Technical, Commercial and Accounting Sections, but those also of the newly-created Public Relations National Section of electric light and power executives to deal with public relations and public policy as they affect the general public and the allied electrical industry. Much of the work planned at that time has been started and is gathering weight and momentum.

"By unanimous vote of the membership the electrical manufacturers became active members of the Association and are represented on the Public Policy and the National Executive Committees. Electrical manufacturer members have taken a very prominent part on committees and in conferences in the various Geographic Divisions during the past year. The national co-operative good-will advertising campaign of the electrical manufacturers is one of the noteworthy achievements of the administrative year. In addition, there have been many detailed changes in the constitution which provide, among other things, for a revision of the form of organization through the forming of the country into 12 Geographic Divisions and the inclusion of Canada as a whole as the 13th Geographic Division. Ten of the 13 Geographic Divisions provided for in the constitution already have been organized and the remaining three are in process of formation.

"The purpose of the Geographic Divisions is primarily to unite member companies more closely in a national plan of Association organization which will decentralize many of the national activities. The result sought is the bringing about of state, division and national co-operation in upbuilding the industry so that efficient and economical service may be rendered nationally and locally to the consuming public at the lowest reasonable cost commensurate with national electrical progress.

"When it is considered that only five state associations were affiliated with the National Electric Light Association prior to the year 1920, and that only four Geographic Divisions were functioning either wholly or in part, it is apparent that the officers and membership of the Association have actively undertaken organization work during the year. It was realized early in the formation of Geographic Divisions that no plan should be adopted which would destroy the efficiency of the active state associations nor that would require the organization of state associations where the necessity for such associations does not exist. Therefore, the plan as finally carried out provides that the Geographic Divisions may be composed of the membership of state associations or of delegates, or in Divisions where no state associations exist, through the direct membership of the companies and individuals in the Division. This elasticity in the organization is largely responsible for the results already accomplished in the national field work.

"During the year 1921, the 10 Geographic Divi-

sions already organized have held or will hold conventions or divisional conferences. It is my pleasure to report that the state associations or sections have tied into the divisional or national program in a comprehensive manner and are assisting in carrying on the work throughout the country. They in turn are holding their own conventions or conferences.

"In accordance with the revised constitution, the organization at the executive offices in New York City has been divided into four departments —Engineering, Service, Committee Activities and Publicity. The Engineering Department, which is directly under the Technical Section and the work of which includes co-operation with committees handling inductive interference, safety rules, standardization, etc., has had an extremely active year. Direct service has been rendered many companies, and through the study of local conditions in several parts of the country the Engineering Department has been able to assist in solving problems peculiar to those sections and at the same time develop much of interest and assistance in national problems. This Department has tied in closely with the Service Department through written reports to and conferences with committees and company members.

"Under the supervision of the Executive Committee of the Public Relations National Section, the Publicity Department has planned and carried on a national good-will movement which has progressed very satisfactorily. An exhibit of some of the publicity material prepared and sent out, and of copy actually used in the 'Co-operative Good-Will Campaign' of the National Electric Light Association and manufacturer companies is being shown during the convention. More than 9,000,000 pieces of literature have been prepared and sent out through member companies, and 168 advertisements of manufacturers have been published during the first 6 mo. of 1921, carrying our message to millions through the circulation of 91 publications, including national and popular magazines, newspapers, college magazines, business and trade journals and through reproduction by member companies in hundreds of local newspapers.

"One of the greatest charms of the electrical business is that most of its pioneers still live, and that the young can keep up the enthusiasm of the old while the elders can do much to set old heads on young shoulders. If ever there was an industry in which the dreams of its pioneers and the visions of its young men blend and lead the van in the march of progress, it is the electrical, and certainly no other on this earth offers greater inspiration. If we will but throw our full energy into the task that it is our proud privilege to call ours, these dreams and visions will not fade like the 'empty fabrics' and 'unsubstantial pageants' of the poet, but be translated into the every-day facts of a better civilization."

Wiring Committee's Report Divided Into 13 Principal Sections.

The report of the Wiring Committee, prepared by Chairman R. S. Hale, Edison Electric Illuminating Co. of Boston, and presented at the General and Executive Session Wednesday morning, June 1, was divided into a number of sections, as follows: Section I, attachment plugs and receptacles—standardization; section II, standardization of attachment plugs and receptacles for amperages larger than those allowed on lighting circuits and for 220 volts or for 110-220 volts, 3-wire; section III, appliance plug standardization; section IV, plug connections for brackets and ceiling fixtures; section V, lectures on wiring; section VI, sample boards of wiring; section VII, tests of heater cords; section VIII, progress in wiring; section IX, relations between circuits, floor area and number of outlets; section X, national code; section XI, wiring section for the salesman's handbook; section XII, flatiron fires, and section XIII, tests on wiring.

A more complete report of the activities of the Wiring Committee will be printed in an early issue of ELECTRICAL REVIEW.

Reorganization of Accounting Section Along Geographic Division Lines.

The work of the Accounting National Section began for the current year on July 8, 1920, when the Executive Committee met at headquarters in New York, according to the report of the Accounting National Section, prepared by Chairman J. C. Van Duyne and presented at the first general and executive session of the Convention Tuesday morning, May 31. Taking up the list of committees previously organized, 12 in number, it was directed that two of these, one on Uniform Classification of Accounts and Relations with Other Associations, and that on Form of Annual Reports to Commissions, be consolidated; that three be discontinued, namely, the Insurance Committee (which became a National Committee), the Merchandise Accounting Committee, and the Motor Vehicle Records Committee, both of the latter having fulfilled their functions, in the judgment of the Executive Committee; and that the remaining seven be continued. This made the committees to be active as follows:

Classification of Accounts, Form of Annual Reports, and Relations With Other Associations; Accounting Education; Purchasing and Store Room Accounting; Federal Income Tax Procedure; Bonus Systems; Customers' Records and Billing Methods; Credits and Collections; Accounting Service to Member Companies and the Monthly Bulletin; to which were added by the Executive Committee when it met again on Feb. 24, 1921, the Committee on Investment Budget Control and the Committee on Security Holders' Records. This made a total of 10 active committees.

It was shown that organization under the Geographic Division plan of the revised constitution has progressed throughout the year, a fairly complete tie-in between the Divisional Accounting Sections and the National Accounting Section now being possible. This relationship will permit much closer contact between accounting members throughout the national field, through State Associations, where formed, Geographic Divisions, and so on into the National Section; consequently there is also created a wider field for the selection of committee personnel, greatly facilitating the labors of the National Section chairman in organizing the work from year to year.

It is required by the constitution that a budget

for the administrative year, beginning July 1, be submitted to the National Executive Committee not later than August 15 for approval. The budget for the current year, as approved, and the expenditures thereunder, to date, are as follows:

Committee.	Appropriation.	Expenditures.
Classification of Accounts, etc...	$ 750.00	$465.93
Federal Income Tax.....	750.00	.....
Credits and Collections.....	100.00	.....
Contingent Requirements.....	1,000.00	72.75
	$2,600.00	$538.68

From year to year in these sessions, reports of progress in the matter of standardization of classifications of accounts prescribed by state commissions have been made by the committee, since the Association adopted this Section's compilation of a Standard Classification of Accounts in 1914. The committee, continuing its efforts to that end, has made an interesting report this year.

The work of the various committees, each of which submitted its complete report at the afternoon Section sessions, was then briefly reviewed by Section Chairman Van Duyne.

Organization of Technical Activities Along Geographic Division Lines.

The general problem of committee meetings for the Technical National Section requires further study, according to I. E. Moultrop, chairman of that Section, in an address presented at the first general and executive session of the convention Tuesday morning, May 31. Extracts from Mr. Moultrop's address follow:

"It will be somewhat simplified when each of the Geographic Divisions has technical organizations functioning with the national committees. The country is so large that any scheme of general committee meetings is bound to put an undue burden on many of the member companies, whose representatives should attend these meetings. The plan adopted by the Electrical Apparatus Committee of subdividing into groups, the latter holding frequent meetings and the main committee holding only two or three general meetings, seems to work out very well for that activity. It does not seem so practical for some of the other committees. Moreover, the value of a general committee meeting is considerable and cannot be replaced by any scheme of dividing the committee.

"It must be borne in mind that our technical work like accounting and public policy work is national and not local. It is true that there are many matters of only local interest, but these are of a minor nature. The National Electric Light Association, through its Technical Section, is tied in and co-operates with many of the national engineering societies and other bodies doing engineering work. The work of these bodies is national in its scope and in many ways vitally interests the National Electric Light Association. As examples, the third edition of the National Electrical Safety Code which the U. S. Bureau of Standards has just issued, and the inductive interference problems in various parts of the country are matters in which all member companies must act as a unit. It, therefore, goes without saying that we must have general policies and procedures for our technical work which are uniform for all localities.

"Organizing of technical activities in the Geographic Divisions has made very good progress, everything considered. The Pacific Coast and Northwestern Geographic Divisions developed satisfactory working arrangements with the officers of the Technical Section before the latter returned East from Pasadena, and the results of these arrangements have been most satisfactory. Similar arrangements were made very early last fall with the New England Geographic Division, and these three bodies have been actively functioning in harmony with the Technical National Section. Later in the year the Great Lakes Division, the Canadian Division and the Southwestern Division organized their technical work more or less completely and should begin to function with the Technical National Section next year.

"Some people have raised the question of the necessity of the National Electric Light Association devoting so much time to technical work, especially when there are many engineering societies in this country apparently working to the same end. It should be pointed out that the technical work of the National Electric Light Association does not duplicate that done by the national engineering societies. The broad distinction between the activities is this: The engineering societies devote their time to strictly engineering or scientific work. By their constitutions these societies are prevented from doing what might be considered commercial work. The National Electric Light Association has no such restriction and in effect takes up the work where the engineering societies stop, making practical utilization of it. The fact that over 300 of the leading engineers in the utility field have been earnestly engaged in the technical work of the Association this year indicates the need and value of such work. The technical committees of the Association have representation on many of the committees of the engineering societies where such representation is a benefit, and we are constantly being asked for additional representation on activities of this kind. This procedure broadens the work and tends to eliminate duplication."

Membership Campaign Adds 3000 Names to the Roll During the Year.

Walter Neumuller, New York Edison Co., chairman of the Membership Committee, reported an increase of approximately 3000 during the past year, this gain establishing a new record of increase. The present membership totals approximately 14,200.

An amendment to the constitution was recommended to provide for a more equitable arrangement of membership fees.

Employe Organizations Are Valuable Assets to Central-Station Companies.

Formation of employes' organizations by public-utility companies throughout the country is recommended by a committee of the National Electric Light Association, Chairman David Darlington, New York Edison Co., which presented its report of a study of this movement at the second general session of the convention, Wednesday morning, June 1. The committee's report outlined briefly what has been accomplished by employes' organizations and mentions

meetings, outings, educational classes, savings and building and loan association work as some of the activities undertaken by some of the organizations. The report says in part:

"The experience of the committee has been that the most successful employe organizations are those that embrace within their scope all activities designed for the employe's benefit, such as education, recreation, savings and insurance, so that there is no duplication of organization with its resultant diversity of interests. The committee wishes to point out the immense value to companies of lively, well-developed employes' organizations and feels that those companies which have no such organizations, or whose organizations are dormant, are not making use of an opportunity to develop an asset which should prove of great service."

The Company Employes' Organizations Committee is composed of David Darlington, chairman; E. A. Baily, Henry Bostwick, D. C. Bruce, W. C. Heston, O. A. Jennings, Wm. S. Kline, H. N. Muller, W. N. Ryerson, R. T. Schuettge and G. B. Springer.

Committee Recommends Elimination of Loads With Bad Power-Factor.

The Rate Research Committee directed its efforts during the past year especially towards the betterment of its service to the members of the Association—according to the report of the committee prepared by Chairman Alex Dow, Detroit Edison Co., and presented at the General and Executive Session Wednesday morning, June 1—through the publication of "Rate Research" and the "Rate Book," and by responding to inquiries concerning rates and rate methods.

The committee took occasion to repeat the opinion expressed by it and adopted by the Association a year ago, as follows:

"It is the sense of the Rate Research Committee that loads of unreasonably low power-factor and unbalanced loads on polyphase systems should be considered by member companies as interferences with good service preferably to be prohibited, rather than as variable factors in the cost of the service, to be compensated for in the rate charge. And, further, it is the sense of the Rate Research Committee that when a member company considering furnishing service at low power-factor or unbalanced between phases, decides to supply such service under a contract or under a filed schedule containing a power-factor clause (so-called), the rate charged under that clause should be such as to permit full compensation to the company, while affording inducement to the customer to secure correction of the lower power-factor, or of the lack of balance."

The committee states that "progress made during the year has not been toward unification of practice. We still lack an accepted definition of power-factor. Most of the clauses in use provide that the adjustment of rate shall depend upon 'average power-factor under ordinary operating conditions,' which phraseology is excellent as an expression of good intentions mutually understood, but would permit much wrangling in case of disagreement. No commission or court ruling has been had on the subject. The opinion of the committee is that national uniformity of practice in the formulation or application of a power-factor rate is not likely to be obtained in the near future. It is indisputable that loads of unreasonably bad power-factor must be eliminated or penalized in the interest of our service to all our public."

Sales of Incandescent Lamps in 1920 Showed an Increase of 19% Over 1919.

The activities of the Lamp Committee during the past year, according to the report prepared by Chairman Frank W. Smith, United Electric Light & Power Co., New York City, and presented at the General and Executive Session Wednesday morning, June 1, have been largely confined to the collection of data for presentation in the customary form to the member companies, with respect to the output of incandescent lamps and to other miscellaneous details which it has been the practice of the committee to present in the past. The Subcommittee on Standard Incandescent Lamp Voltages, of which M. D. Cooper, National Lamp Works of General Electric Co., Cleveland, is chairman, has been active and another survey has been made by this committee on this subject, the results of which are presented in the report.

The report of the Lamp Committee states that during the latter part of last year the general business depression manifested itself in the sales of incandescent lamps, but notwithstanding this condition the total sales of lamps, excluding miniature, in the United States during 1920 amounted to 202,000,000 tungsten filament lamps, an increase of 19%, or 32,000,000 over 1919, as compared with a gain of 12% for 1918 over 1917, and of 2.4% for 1919 over 1918. In addition there were 9,000,000 carbon lamps sold during the year, a decrease of 4,000,000 lamps over 1919. The output of carbon lamps now constitutes only about 4.25% of the grand total.

A more complete report of the Lamp Committee's activities will be printed in an early issue of ELECTRICAL REVIEW.

Committee Urges Co-operation in Development of Electric Power.

The report of Electrical Resources of the Nation Committee, prepared by Chairman M. S. Sloan, Brooklyn Edison Co., Brooklyn, N. Y., and presented at the General and Executive Session, Thursday morning, June 2, states that the press of the electrical industry has presented recently an estimate of the demand for power that may be required by 1925, including the great war superpower districts and the development of water power under the new Federal Power Commission. It figures that this demand will require an increased capacity by that time of 11,700,000 kw., costing, exclusive of customers' appliances, $3,706,000,000. The committee's report placed the actual available central-station operating capacity a year ago at about 11,000,000 kw. Accepted at its face value, this new estimate means doubling the capacity of the industry again in less than 5 yrs.

The estimate is impossible and hopeless of fulfillment, continues the report. It is a statement of gross returns not expected to be realized, and is quoted merely to show a trend. But if half of

it is necessary by 1925, at the rate of progress of the past year it will not be reached. There has been no flow of money to the industry at the rate of half a billion a year during the past year, nor are there signs of it now. In order to meet the problem of increased capacity a broader movement is required than that recommended by the committee in its first report, which was that the problem of the industry be presented to the state, showing its immediate and real relation to the prosperity of the communities making up the state.

A single instance of this has occurred—that of California—and its good results were at once apparent. The shortage of power due to drought in California so affected the industries of the state that its inhabitants had proved to them conclusively the necessity of electric power to their industrial life. The companies got together and joined the state authorities in a study and a solution of the problem, which was presented to the people so effectively that co-operation in the development of power has taken the form of a great public movement, so much so that the junior securities of these great power companies are being rapidly absorbed by the consumers of power in the state and by investors who are indirectly, if not directly, concerned in the use of electric power.

It is just such work that lies at the hand of the member companies of the National Electric Light Association in each state or natural industrial power district. Outside of California it is very doubtful if the great industrial states realize the present and future importance to them and to the nation of efficient and sufficient electric power supply. They must be educated by showing how such supply affects the economic productiveness of their communities and the pockets of their citizens. It is only in some such co-operative educational way that the large future demand for electric power will be successfully met.

Insurance Committee's Work Expedited by Appointment of Subcommittees.

The duties of the Insurance Committee, according to the report prepared by Chairman S. E. Wolff, Hodenpyl, Hardy & Co., New York City, and presented at the General and Executive Session Thursday morning, June 2, were "to study the various phases of fire, liability, casualty and other insurance as they affect the members of the Association, to gather information regarding same, to receive regular reports of the Association's insurance expert, and to report to the Association improved methods of dealing with insurance, and, if possible, to make recommendations toward reducing the cost of insurance."

In line with this program the chairman of the Insurance Committee appointed the following subcommittees: Insurance Statistics and Rates Subcommittee, Fire Insurance Forms Subcommittee, Automobile Insurance Rates Subcommittee and Fire and Liability Insurance Manual Subcommittee. The results of the committee's work on the particular subjects assigned to its subcommittees are shown in their detail reports included in the report of the Insurance Committee.

A more complete report of the activities of the Insurance Committee will be printed in an early issue of ELECTRICAL REVIEW.

Water Power Development Committee Works With Federal Commission.

Arrangement of rules and regulations for the proper development of water power has occupied the greater portion of the time of the Water Power Development Committee, of which F. T. Griffith, Portland (Ore.) Railway, Light & Power Co., is chairman, according to its report presented at the General and Executive Session Thursday morning, June 2. Work with the Federal Power Commission has resulted in many changes that will permit of a workable arrangement for proper and reasonable development. Attention can now be given to the actual work of utilizing the water powers that are available, the preliminaries having been cleared away.

DEVELOPMENT OF HYDROELECTRIC RESOURCES IS VITAL ECONOMIC PROBLEM.

Henry J. Pierce, Washington Irrigation & Development Co., Seattle, Wash., in discussing this report, said that the work now done opened up the way to great development. He pointed out that the present law and rules established the desirability of handling water developments as a monopoly rather than as a competing business. America must have cheaper power in order to be in a position to compete with foreign countries now having the cheapest of labor and large quantities of fairly cheap power. There is not enough water power east of the Rocky mountains to care for the needs of that territory, while there is a great excess of power west of the mountains. Because of this unbalanced power supply it was pointed out that industry had a great opportunity in the Far West. Development of hydroelectric resources is the most vital economic problem before the people of the country at the present time.

John A. Britton, Pacific Gas & Electric Co., San Francisco, said the matter of water power development is of vital importance to the West. There is no supply of coal in California, so the development of water power became an important factor at an early date. Oil temporarily retarded hydroelectric development, but later the great needs of the territory demanded developments of water. Great work is already planned definitely that will absorb a good proportion of the present available resources. Co-operation between men of the industry and the government is essential to accomplish the full measure of benefit to be derived from the operation under the present Federal law.

Interstate Commerce Commissioner Speaks on Utility Regulation.

Hon. E. I. Lewis, member of the Interstate Commerce Commission, in speaking at the General Session June 2, on the current aspects of utility regulation, said, "I have wondered how public utility operators have been able to stand the trials that have been met since the closing of the great war." He spoke of increasing costs in their influence on operating expense and the efforts of regulating bodies to keep from forcing further burdens upon the hard pressed utilities. Then certain features of receding markets brought on the demand for immediate decrease in rates. However, the increases that were made

on the rising markets were not of such magnitude as to leave present incomes sufficient to warrant great reductions now.

While industry called for great increases in plant output during the past years every effort both physical and financial was turned to the delivery of the output to meet the demand. Thus there is now a great quantity of deferred maintenance to be taken care of. Wages of many classes of labor have risen and cannot be reduced to former levels. Taxes are carried by public utilities in greater quantities than ever before. For these reasons utility rates cannot return to their old levels.

Regulating bodies now stand between an ill-advised public and the utilities in an effort to bring together all parties to their mutual benefit. Utilities can help by giving full co-operation, by removing and eliminating questionable practices, by ceasing to "pass the buck," by using tact and diplomacy in dealing with patrons, by being liberal in dealings with customers, by treating the public fairly regardless of whether or not something is wanted from the public at the time.

No governmental policy can long continue, Mr. Lewis said, without the support of public opinion, and it is essential that utilities assume such an attitude toward the public that the public may be lead to support a general desire for the continuation of commission regulation. The general public services commonly provided by municipal funds are almost always supported by the voting of sufficient funds, but such utilities as are supported by rates are almost always subject to attack. Higher degrees of continuous service are demanded of the rate paid utility services than of the services supported by general taxation. Starved utility service cannot long continue to render proper service, and no city can accomplish even a reasonable measure of prosperity without proper utility growth. In order to provide for the required growth it is essential that reasonable attitudes be taken towards regulation that will allow rates adequate to create the needed credit. Good will and good public favor requires continued fair dealing on the part of the utility, and the public should understand that it must provide for the funds required to support the service.

Describes Advantages of Electric Vehicle in Transportation.

"The Electric Vehicle" was the subject of an address by Arthur Williams, general commercial manager of the New York Edison Co., before the General and Executive Session Thursday morning, June 2. During the course of his remarks he stated that in the electric vehicle the central station has an opportunity for the development of a profitable business by telling the story of the electric as it relates to economical transportation, safety on and cleanliness of the streets, relief of traffic congestion and the lowering of living costs through the elimination of unnecessary handling and transferring.

Mr. Williams described the advantages of the electric vehicle and cited instances of its performance to demonstrate its utility for merchandise transportation and other purposes.

Contact With the People Promotes Sales and More Friendly Attitude.

"Your average customer is the man you see everywhere," said Harford Powel, Jr., editor of *Collier's,* in an address at the General Session, June 2, on "Contact With People." "He is the man that called this service into existence, and he is the man that the industry serves. People used to think they were getting along well with candles, but the electrical industry has taught the average customer different. Now the industry knows that it is only a matter of telling the average man about the many things that are available, for him to want them.

"There are about 5,000,000 unwired houses within reach of existing electric lines. Giving service to this great array of prospective customers requires such an outlay of money that there is only one place from where it can come—the savings of the public. The industry has gotten beyond the stage of conducting an advertising campaign; a campaign is entirely too limited to serve the needs. The effects of a campaign do not last and if the public is made to continue to understand the problems of the industry the public must be reminded continuously of those problems.

"The average man is the individual who makes or breaks any enterprise, and it is the individual, not the public that must be catered to. The clerks who meet the customers of the company are the symbols of the company and they have a vast influence on the impressions that the public gain of the company. The question of satisfying existing customers is vastly more important than attracting new customers. Rebuilding the electric meter to read in dollars and cents would please the consumer."

Fire Prevention and Health Promotion Are Featured in Report.

The report of the Accident Prevention Committee prepared by Chairman Charles B. Scott, Bureau of Safety, Chicago, and presented at the General and Executive Session Thursday morning, June 2, covered the subjects of organization, health promotion, fire prevention, operating methods, ground detectors, devices and appliances and apparatus.

The committee recommended that the membership secure a sufficient number of copies of the report to supply each of those interested within their organization—particularly the operating departmental heads, supervisors and foremen.

Electrification of Railways Will Result in Better and Cheaper Transportation.

"Railroads came into use because of the great economy of transportation at low cost of all kinds of commodities," said Louis A. Ferguson, of the Commonwealth Edison Co., Chicago, chairman of the Steam Railroad Electrification Committee of the National Electric Light Association, at a general session of the convention June 3. "Wonderful growth in capacity and refinement has taken place in the steam locomotive. Canal transportation came into use, but because of slow speed fell early into decay. In spite of the great progress

made in locomotives they cannot compete in economy with stationary plants. Enlarged terminals and yards are required to care for the vast increases in freight and passenger service, and the best way of enlarging such terminals requires that yards and terminals be constructed in several levels. Such a type of terminals requires the elimination of the steam boiler from the locomotive.

"Tunnel service, yard capacity, increased speed, increased labor efficiency and other items of economy furnish some of the incentives for the electrification of steam roads. The 6500 central stations of the country may be looked upon in electrical operation as so many 'coal mines' standing ready to supply 'fuel' to the railroads all over the country and in such quantities as may be required by the needs. Polyphase energy at a frequency of 60 cycles will soon become the standard for the entire country, such standardization greatly simplifying the problems of making electrification universal. Legislation that will result in stabilizing the financial situation of the railroads, and co-operative engineering studies are essential to the early advancement of this great electrification plan.

"Public opinion is the strongest influence in our form of government, and American public opinion has been found to be of the greatest value."

Ownership of Utility Stock by Customers Is Discussed at Last Session.

In his discussion of "Customer Ownership" at the closing session of the convention June 3, John F. Gilchrist, Commonwealth Edison Co., Chicago, said that a growth of from 8 to 10% per year has been found to be normal in the central-station business, and it is probable that such a rate of increase will continue during the next 10 yrs. It has become a question as to whether the available financial resources that can be reached will be sufficient to meet the needs of the industry. There is no more natural place for the people of a community to invest their savings than in the properties of the utilities that serve them. The stability of central-station securities have been well tried and the past year has shown a decided turn in favor to such securities. About 1% of the population of the country and 5% of the customers are now owners of utility stock.

R. H. Ballard, Southern California Electric Co., said that the question of distributing securities to customers was probably the most important one before the central-station industry. Customer ownership, he said, was a form of public ownership that was practical and productive of economical operation. Public support of utilities is helped greatly by the wide distribution of stock to customers.

J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, said the industry owed a debt of gratitude to the Pacific Gas & Electric Co. for inaugurating the idea of wide local stock distribution. It is going to take thought and work, but utility stock can be sold to the customers. Stock salesmen have not made a pronounced success in selling stocks to customers, utility men themselves being most successful. Newspaper advertising was said to be one of the very best means of placing the situation before the public. The partial-payment plan, and the interesting of the small investor is all important. Final closing of the sale by a regular sales organization was said to be advisable. Stockholders' meetings are of the greatest value in providing for the building up of good public opinion.

Accounting National Section Sessions

Chairman J. C. Van Duyne, of the Accounting National Section, opened the first session of this Section with a resume of the activities of the various committees. An abstract of his report, delivered at the first General and Executive Session, will be found under that head.

Officers elected at the closing session of the Accounting National Section for the ensuing year are as follows: Chairman, E. J. Fowler, Commonwealth Edison Co., Chicago; vice-chairman, William Schmidt, Jr., Consolidated Gas, Electric Light & Power Co., of Baltimore; W. E. Long, The Philadelphia Electric Co., Philadelphia, and W. A. Jones, Empire Electric Co., Joplin, Mo. The following members-at-large were elected for 2 yrs.: Oliver C. McCormick, Middle West Utilities Co.; R. R. Reidford, Pacific Gas & Electric Co., and P. R. Ferguson, Southern Sierras Power Co.

Committee Work Accomplished on Standard Classification of Accounts.

The efforts of the Classification of Accounts, Reports to Commissions and Relations with other Associations Committee during the current year have practically been confined to work in connection with the revision and development of the National Electric Light Association standard classification of accounts, according to the report of the committee prepared by Chairman W. J. Meyers, United Electric Light & Power Co., New York City, and presented at the first accounting National Section session of the Convention, Tuesday afternoon, May 31. Most of this work has been done in conjunction with the corresponding committees of the American Gas Association and the National Association of Railway and Utilities Commissioners.

While not all of the recommendations made by this committee were accepted by the commissioners' committee, and while that committee insisted on embodying in its classification certain clauses in the nature of administrative regulations which in the opinion of Mr. Meyers' committee should not be included in a classification of accounts, the report of that committee was judged by this committee to be as good as can be secured at the present time and a great improvement over the classifications now in effect in most of the states. This committee therefore recommended to the Executive Committee of the Accounting Section that, with the exception of the regulatory clauses, the draft be submitted to the Executive Committee of the National Electric Light Association as embodying the views of the

Accounting Section insofar as it seems practicable to get them adopted at the present time by state commissions.

Examples of Modern Accounting Methods of Handling Supply Material.

The report of the Purchasing and Storeroom Accounting Committee, prepared by Chairman W. F. Stevens, Edison Electric Illuminating Co. of Boston, and presented at a meeting of the Accounting National Section, Tuesday afternoon, May 31, was divided into six main parts as follows:

Part I—Following Vendors for Delivery on Purchase Orders for Supply Material—covered a discussion of various processes of following vendors for material in use today among the larger companies, and gave an outline of the methods of one company which have met with success.

Part II—Method of Handling and Accounting for Returnable Reels and Containers—outlined a plan for the identification and efficient recording of drums, reels and containers, subject to return to the vendor for credit, and also gave a detailed description of the methods employed successfully in one company.

Part III—Control of Stock—contained a discussion of the value of such a system divided into three parts, viz., (a) study of the problems of the work, (b) comparative results of control among a group of the larger companies, and (c) outline of a plan in use in one of the larger companies.

Part IV—Method of Handling Cash Discounts on Invoices for Supply Material—referred to a study of the details of cash discount procedure, with special consideration to the contingency of double payment, and gave in detail the methods employed in one of the largest companies as an illustration of an efficient and successful system.

Part V—Adjustment of Claims on Purchased Material—covered a study of the requirements of the work and contained an example of good practice in a large centralized storehouse.

Part VI—Subjects Referred to the Succeeding Committee—gave a list of a number of subjects upon which the committee had devoted some time, but, not having given them sufficient study for a formal report, voted to refer them to the succeeding committee for consideration during the coming year. The most important of these subjects are as follows: (1) Policy of Retaining Invoices in the Purchasing Department, (2) Duplicate Invoice, (3) Salvage Work, (4) Routine of Handling Obsolete and Slow-Moving Material, (5) Adaptation of Hollerith Tabulating System to Storehouse Work, (6) Some Phases of Inventory Procedure which were not included in the 1920 report, and (7) Code Numbers on Stock.

Recommend National Committee to Handle Problem of Federal Taxation.

The duties of the Committee on Federal Income Tax Procedure in a general way are: (a) to keep advised as to the requirements of the Federal Income Tax Law and the regulations thereunder applicable to electric light and power companies, especially the requirements relating to accounting and procedural features, (b) to bring to the attention of member companies from time to time points which will be helpful in the preparation of Federal tax returns of such companies, and (c) to consider and advise with respect to Federal tax questions submitted to the committee by member companies.

The subject of federal taxation—indeed, the whole subject of taxation, Federal, state and local—is of the highest degree of importance to the light and power industry at this time and will continue to be for some years to come, according to the report of the Federal Income Tax Procedure Committee, prepared by Chairman F. B. Odlum, Electric Bond & Share Co., New York City, and presented at a meeting of the Accounting National Section Wednesday afternoon, June 1. Many member companies are paying as much as 10% of their gross income in taxes. None of the present proposals concerning changes in the Federal law seem to contemplate a reduction of taxes on public utilities, assuming that the present excess profits tax has no practical application. Many of such proposals contemplate an increase in the normal income tax.

It is the belief of the Committee that taxation—Federal, state and local—should be given more attention by the general Association than it has been given in the past and that the authority and responsibility in this respect should be centered in one committee, equipped and empowered to act for the industry in connection with the proposed revision of the Federal law. The subject of taxation is closely interrelated with the subjects of finance, public policy and accounting and might well be placed under the jurisdiction of a separate National Committee, the membership of which would be drawn from the various interested branches of the industry, to insure that all phases of the problem will be given the proper degree of consideration.

Pointers Are Given on Machine Billing and Ledger-Posting System.

The activities of the Customers' Records and Billing Methods Committee have extended over a period of 5 yrs., according to the report prepared by Chairman J. D. Jacobus, Detroit Edison Co., and presented at the Accounting National Section session, Wednesday afternoon, June 1. The committee was organized in 1916 and during this time has covered the subjects allocated to it quite thoroughly, beginning with a questionnaire which was sent out to member companies requesting information as to the different methods of billing, reading meters, etc.

Subsequent reports have dealt more directly with certain subjects, such as billing other than monthly, machine billing and balance sheets. This year's report covers methods in use by various companies in reading meters, prevention of curbstone readings, reading of skip meters and methods used to insure billing of all meters in service.

The committee is of the opinion that a close study should be made to insure member companies having a system whereby all meters in service are billed, as it is an easy matter for a customer's record to become lost if not properly safeguarded. Included in the committee's report is the machine billing and ledger-posting system in use by the Consumers Power Co., Grand Rapids, Mich.,

which brings out some interesting points and describes a system that is suitable to the smaller member companies as well as the large companies.

Records Used in Coal Accounting Described in Paper by Mr. Edwards.

In a paper on "Accounting for Coal," prepared by H. M. Edwards, auditor of the New York Edison Co., and read before the Accounting National Section, Wednesday afternoon, June 1, it was stated that the term "accounting" comprises all records of every description relating to coal, from the time it is purchased up to the time it is put into company bins or sold. The accounting procedure must necessarily follow and reflect the conditions surrounding the purchase and delivery of coal.

Bituminous coal is largely purchased f. o. b. mine, delivery being evidenced by railroad freight bills showing car numbers, weight of coal in pounds in car, date of departure from shipping point, and showing also the delivery point—one of the tidewater coal ports. Some shippers sell coal alongside the company dock. Coal delivered f. o. b. company dock requires a simple accounting system, which is outlined by Mr. Edwards. The more complicated records involved in connection with f. o. b. mine purchases are explained, and other matters such as purchasing department records, auditor's records, station or storage records, subsidiary records, etc., are also covered. The forms in use in such systems are illustrated and their functions described.

Important Features of Security Holders' Record Work Pointed Out.

At the one meeting which the Committee on Security Holders' Records held in May, only a few weeks before the convention, a number of different features of security holders' record work were discussed, according to the report prepared by Chairman (pro. tem.) E. J. Fowler, Commonwealth Edison Co., Chicago, and presented at the Accounting National Section session, Thursday afternoon, June 2, in which the committee called attention to the following as being the most important:

The use of the addressograph machine, with a special attachment for numbering and dating, for the making out of the entire dividend check except for the signature of the signing officer, is a practice which is in use by some of the companies who have had the longest experience with a large customer-stockholder list. This method results in a considerable saving, not only in the clerical work involved, but also in the time required to get out the dividend check.

The signing of dividend checks by the cashier or assistant cashier only, as compared with the earlier practice of having two of the higher officers signing, is noteworthy. The different forms of receipts issued when payments are made on the deferred-payment plan, and the question of sending these subscribers a monthly statement are discussed. The question as to whether a guaranteed signature or a signature card record is the better method in connection with making stock transfers, is also discussed.

Commercial National Section Sessions

As the result of election of officers at the closing session of the Commercial National Section there were elected: Chairman, Richard H. Tillman, Consolidated Gas, Electric Light & Power Co., Baltimore; vice-chairmen, Oliver Hogue, Commonwealth Edison Co., Chicago; Norman T. Wilcox, Mississippi River Power Co., Keokuk, Ia., and C. E. Michel, St. Louis. Additional executive committeemen will include M. S. Seelman (ex-officio), Brooklyn Edison Co.; George A. Hughes, Edison Electric Appliance Co., Chicago; Merrill C. Morrow, Westinghouse Electric & Manufacturing Co., Pittsburgh, and L. R. Wallis, Edison Electric Illuminating Co. of Boston.

The importance of this Section cannot be overestimated and the work undertaken by the various committees, bureaus and divisions could well have formed a separate convention of no mean magnitude. In this Section alone there were 41 reports and papers listed for submission. In addition to that there were many instructive discussions. So great was the magnitude of the work in this Section that an effort is being made to hold a midwinter meeting in the future, a project which has been submitted to the National Executive Committee for decision.

Publicity Service Bureau Points Out Duty of Electrical Industry.

This has been a year of fruition in the electrical advertising field, and as a result the Advertising and Publicity Service Bureau has been more busy this year in helping to stimulate, guide and round out accepted advertising plans than in thinking up new plans for the future, according to the report of the Bureau prepared by Chairman L. D. Gibbs, Edison Electric Illuminating Co. of Boston, and presented at a meeting of the Commercial National Section Tuesday afternoon.

The National Good-Will Campaign conducted from headquarters under the direction of the Public Relations National Section has had the hearty support of every advertising man in the electrical field. This has included a number of pamphlets prepared by George F. Oxley, director of publicity for the National Association, and a National Co-operative Advertising Campaign in which the National Association and a large number of electrical manufacturers have co-operated.

The duty of the industry now lies in maintaining the closest possible contact with Mr. Oxley, showing interest by making helpful suggestions and to see that wherever possible the follow-up is completed in results. Those results, as the Bureau sees them, lie in, first, a real appreciation on the part of the manufacturers of the fact that their interests carry clear through the line of transmission to the ultimate customer, and that the central station cannot be by-passed as being able to take care of itself in its own little field; second, in a fuller appreciation by manufacturers and central stations alike of how great a source of help

the National Electric Light Association can be, and third, a deep and lasting appreciation of the value of co-operative and promotional advertising on the part of the central-station interests.

The reports of the several divisions of the Advertising and Publicity Service Bureau are summarized in the succeeding paragraphs.

Report of Adequate Outlets and Co-ordinate Advertising Divisions.

This division recognizes as its function assistance toward providing ways and means of educating the public, architects, builders, contractors and central stations with the importance of adequate wiring and outlets. Recognition of this basic principle is so general throughout the industry, states the report prepared by Chairman P. L. Thomson, Western Electric Co., New York City, and presented at a meeting of the Commercial National Section Tuesday afternoon, May 31, and so many of its activities unconsciously are being directed to that end that it has seemed to this division advisable to limit its activities to work not being specifically duplicated elsewhere. During the year, therefore, the division has continued, as in 1919, to draw the manufacturers' attention to cases in their advertising where the provision for electric outlets in the wall was unconsciously being overlooked and connections to appliances being made from existing lighting sockets. The division renewed its recommendation that it be made the business of some one man in every central station to contact with architects and builders in his territory so that adequate outlets may be installed in future buildings.

The division has made no change in the schedule of commodity sales adopted several years ago by the Committee on Co-ordinate Advertising, and renews its belief in the principle upon which this calendar was based, and believes that, so far as it is compatible with manufacturers' production schedules and electrical dealers' selling schedules, the idea of synchronizing national publicity with local publicity should be followed. The schedule of appliances is as follows: January, clearance sales; February, heating pads; March, vacuum cleaners; April, sewing machines and sewing-machine motors; May, grills; June, irons; July, fans; August, clearance sales; September, washing machines; October, radiant heaters; November, toasters, and December, electrical Christmas gifts.

Report of Illuminating Engineering Non-technical Applications Division.

This division has made itself as useful as possible to the Commercial National Section by giving publicity to the nontechnical applications of lighting in the industrial and commercial fields, according to the report prepared by Chairman P. B. Zimmerman, National Lamp Works of General Electric Co., Cleveland, and presented at a meeting of the Commercial National Section Tuesday afternoon, May 31. In this work it has received splendid co-operation from the editors of the electrical press, and as a result lighting has been the subject probably of more editorials and articles than any other one subject featured in the electrical magazines during the past year.

The membership of the division represents primarily the advertising specialists of those manufacturers and central stations particularly interested in promoting better lighting and in extending its field. The division has striven to announce in advance and to gain popular interest and approval for each of the permanent industrial lighting exhibits of the National Electric Light Association. It has also been concerned in the preparation of informative publications to give the installer of lighting more definite information in nontechnical form to help him in his everyday work of installing lighting equipment.

Report of Newspaper Advertising Campaigns Committee.

This division has devoted its efforts principally to finding a way to increase the use of electrical page newspaper advertising, recognizing that the value of such advertising has been established, as is shown by its use in many cities. It feels that the fact that electrical pages are not more extensively used is due to the indifference of the electrical interests involved and not to any shortcoming in the idea itself, according to the report prepared by Chairman Norman Maul, New York Edison Co., and presented at a meeting of the Commercial National Section Tuesday afternoon, May 31. Therefore the report seeks to offer assistance to those companies which decide to go into this form of publicity.

The report confines itself principally to suggestions as to how the use of the electrical page can be furthered, samples of various electrical pages being shown.

Report of News Syndicate and Magazine Writers' Division.

This division has confined its efforts to completing a photographic bureau to which magazine and syndicate writers may apply for acceptable pictures to illustrate their articles; also to the continuance of the experiment of supplying syndicate material to electrical pages of newspapers, and the preparation of a document setting forth completely all the various plans and methods successfully employed in starting and conducting newspaper electrical pages. The division believed that such a guide would prove invaluable as a stimulant and basis of largely increased activity among newspapers, according to the report prepared by Chairman Frank B. Rae, Jr., Cleveland, and presented at a meeting of the Commercial National Section Tuesday afternoon, May 31, but the work was abandoned when about half complete pending a clearer understanding and closer co-operation with the various interests affected.

Report of Publications Division.

The publications which this division had printed last year, namely, "The Christmas Folder," "The Christmas Booklet" and "The Modern Home Booklet," did not sell as well as anticipated on account of the business conditions prevailing throughout the country, according to the report prepared by Chairman Cyril Nast, New York Edison Co., and presented at a meeting of the Commercial National Section Tuesday afternoon, May 31. Several circular letters and one special folder with samples were sent out from headquarters of the National Electric Light Association.

The division does not believe that it is a good idea to get out any new printed matter until the supply on hand has been disposed of, with possibly one exception, "The Iron Folder," asked for by the National Wiring Committee, which it is hoped to issue soon.

Popularity of Home-Study Courses Indicated in Education Committtee Report.

The report of the Education Committee prepared by Chairman Fred R. Jenkins, Commonwealth Edison Co., Chicago, and presented at a meeting of the Commercial National Section Tuesday afternoon, May 31, disclosed considerable activity in this very necessary and helpful line of work. It indicated 2061 students enrolled in the Commercial Engineering Course and 2,302 in Practical Electricity. The studies embraced in both of these courses have been selected with great care and graduated students should be well qualified to successfully cope with the work of the positions which these courses are intended to cover.

The courses are offered under four plans which are calculated to make it an easy matter for even low-salaried employes to take them. The number of students indicates that considerable interest in getting this education is shown by employes and the committee contemplates greater activities the coming year to materially advance the scope of the work.

Electrical Salesman's Handbook Published in Pamphlet Form.

The report of the Electrical Salesman's Handbook Committee prepared by Chairman George H. Stickney, Edison Lamp Works of General Electric Co., Harrison, N. J., and presented at a meeting of the Commercial National Section Tuesday afternoon, May 31, stated that early in the fall of 1920 a circular letter of inquiry was sent to the salesmanagers of member companies. Questions were raised as to size and form of book and general character of material needed by salesmen. The answers were very meagre in number, and seemed to indicate that a relatively small number of members were very much interested in the handbook.

The committee decided to publish two sections of the book in pamphlet form which were on sale at the convention.

Interesting and Valuable Report Presented by Power Sales Bureau.

The Power Sales Bureau was organized in the summer of 1920, according to the report prepared by Chairman H. H. Holding, Public Service Electric Co., Newark, N. J., and presented at a meeting of the Commercial National Section Tuesday afternoon, May 31. It was planned to include four active divisions embracing general power; electric arc steel furnaces; industrial electric heating and non-ferrous metal furnaces; economics of the use of central station power and isolated plants.

While there existed, at the time of organization, a "sellers market" for electric service and central stations were laboring under a shortage of capacity, the reports under the various divisions lose none of their usefulness as central-station service is as potent in the lean years as in the fat ones.

Economics of the Use of Central Station Power.

This phase of the report was divided into four separate sections as follows: "Dollars and Factors"; "Conjunctional Operation of Central Station and Isolated Plant"; "A Method of Analyzing Generating Costs" and "200-kw. Power Plant Costs."

To C. J. Russell, general commercial manager of the Philadelphia Electric Co., belongs the credit for the splendid paper on "Dollars and Factors," which treats of the relation between dollars and those factors affecting the economic results of their utilization with reference to public utilities.

In the analysis, Mr. Russell has taken from the census reports of 1914 the figures showing the "Capital," "Gross Earnings," "Expenses" and "Apparent Net Gain" from an average manufacturing industry, from an average public utility and those of a retail grocery store. These figures showed that for each dollar of capital the gross earnings in each case were:

Manufacturing business	$1.07
Public utility	.172
Retail grocery	8.875

Total expenses were respectively 84.5%, 81% and 93% of the gross earnings. Thus, from these figures, it is clear that if a dollar of income is added in each case the net returns will be respectively 15.5%, 19% and 7%. These figures, roughly, are indicative of what additional business means. In the case of the public utility they do not give full credit as the ratio of expense will not remain the same for the added business. While the importance of increasing gross earnings is very great Mr. Russell points out that when the annual gross earnings upon $1 of capital are $0.12, the operating expenses must be kept within 25% of the gross earnings or the payments mentioned can not be made. When the gross earnings are $0.20 for each dollar of capital the operating expenses may reach 55% of the gross earnings and the payments specified may be made. If the gross earnings equal $0.36 for each dollar of capital the expense may be 75% of the earnings, and so on.

"The maximum permissible ratio of expense to gross earnings, expressed in per cent, may be found by deducting from the ratio of gross earnings, the amount of $1 capital must earn, and dividing the result by the ratio of gross earnings."

Method to Improve Load-Factor.

From data collected from this and other countries the author expresses a doubt that the average load factor would exceed 15%.

Increase in the load-factor should come from stimulating the demand from present customers or in getting "new customers whose needs for current will not coincide with the demands of customers now supplied."

It is important to secure summer business of all kinds, business conducted only by daylight and

business conducted between 9 p. m. and dawn, as well as business of an intermittent character, as these will improve the load-factor.

With reference to the question of "ratio of expenses to gross earnings" the author says:

"It may be stated in a general way that the importance of reducing expenses is sometimes over-estimated. If such a decrease in expense involves lowering the grade of service rendered such a step will prove a false economy. Perfect service is the true ideal for any public utility."

Conjunctional Operation of Central Station and Isolated Plant.

The basis of this report is the investigation of the conjunctional operation of central station and isolated plant established by the Edison Electric Illuminating Co. of Boston. Following the definition of "secondary service" the report illustrates by the aid of graphical charts the various factors entering into the operation of isolated plants, theoretical advantages due to the utilization of exhaust steam and the unit cost per kilowatt per year for fixed charges, labor and coal.

A statement of the earnings from this source is given and the details analyzed.

A more complete report of the activities of the Electric Heating Division, Steel Furnaces Division and the General Power Division will be printed in an early issue of Electrical Review.

Merchandising Very Important Link Between Central Station and Public.

In the report of the Merchandise Sales Bureau prepared by Chairman Dorsey R. Smith, Consolidated Gas, Electric Light & Power Co., Baltimore, and presented at a meeting of the Commercial National Section Wednesday afternoon, June 1, reference was made to the fact that merchandise departments can be made of invaluable help to central stations, as they are the one important connecting link between the station and the public. Every effort should be made to develop central-station merchandising business. Central stations can be and should be the leaders in this field and should make every attempt to keep in close touch with the large number of electric specialty shops springing into existence in all parts of the country. First, for protection of their service; second, for the protection of their customers, and third, that they be not inconvenienced in being asked to repair appliances of an inferior grade and inconvenienced through the possible failure of a new concern which might leave much low type of mechandise behind.

There is much work ahead for the industry, continued the report. During the normal year before the war, 1913 for example, an average of 400,000 permits for the building of homes were issued annually. A couple of years later war diverted from home building and as a result there is now a shortage of 1,500,000 homes in the country. To clear up this shortage and get back to normal conditions within 5 yrs. 600,000 homes will have to be built each year. These figures are taken from results of actual investigation. There are approximately 21,000,000 homes in the United States, and of these only a few more than 6,250,000 are wired for electricity. Over 14,000,000 homes remain yet to be wired and of this number 5,000,000 are in areas where central-station service is available. Over 350,000 farms have individual power plants. This means that there is profitable work ahead for every branch of the electrical industry, and especially that part having to do with selling electrical appliances.

Report of Electrical Merchandising Division.

In his report Chairman C. E. Greenwood, Edison Electric Illuminating Co. of Boston, covered load-building possibilities and good-will value in giving the large meaning to central-station service. It pointed out the stimulus to the trade and help to the local electrical dealers which the properly operated central-station shop gives. For the benefit of the central-station members who have not started to merchandise electrical appliances, or who do so in a modest way, some of the primary subjects for consideration are outlined under the captions—Choice of Merchandise and Electric-Appliance Development, Buying, and Merchandising Accounting.

It is stated in the report that the subject of Merchandise Cost Accounting has been capably handled by committees of the National Association of Contractors and Dealers and the Jobbers' Association. The National Electric Light Association has in mind the general study of the cost of operation of electric shops through the medium of one of our leading colleges that has made similar studies in other lines. If the plan is carried through it will be conducted by the four branches of the industry co-operating in the expense.

Report of Electric Shop Management Division.

The most important subject in connection with the management of an electric shop is the organization, according to the report prepared by Chairman Thomas Berger, Philadelphia Electric Co. For the purpose of analysis the organization was divided into the following classifications: (1) executive, (2) sales, (3) stock, (4) service, (5) advertising and display, (6) accounting and clerical, and (7) statistical work. For the purpose of a clear analysis each of the above subdivisions of organization was treated separately, and under each subdivision was considered along with the personnel of organization, the best methods of actual operation, as in this manner a clearer and more understandable report can be made than if organization and methods were treated as separate items.

It is the opinion of the Division that the fundamental part of electric shop management is the production of business; all of the routine work incident to the operation of an electric shop must necessarily depend upon sales, continues the report, and if the organization is not capable of producing sales it follows that there is no work to be done by the other parts of the organization. Any discussion, therefore, concerning management of electric shops must necessarily be founded almost entirely upon the production of business, as this has, heretofore, been the weakest part of electric shop organizations. In the opinion of the Division too much stress has been laid upon clerical routine work before the business was secured, and that too much study has been

given to the details in connection with the handling of the business and not enough to the production of the business itself.

A more complete report of the activities of the Electric Shop Management Division will be printed in an early issue of ELECTRICAL REVIEW.

REPORT OF STANDARDIZING AND TESTING DIVISION.

The report prepared by Chairman R. S. Hale, Edison Electric Illuminating Co. of Boston, stated that the general principle of the Division is to work along the lines of inciting the manufacturers of various merchandise articles to standardize tests of their articles and then publish the results of such standard tests. The ultimate cost of testing should be borne by the user. Further, the ultimate cost of testing should be really a negative quantity, that is, the making of these tests should in the end so improve the articles sold that the purchaser will get a better article at a less price than if the present method continues whereby the only method of determining whether an article is satisfactory is to put it into commercial use and then wait one or several years before the tests can be completed.

It was the opinion of the Division that its work should in all cases be pioneer work to start the work and to provide enough tests so that the manufacturers shall be willing to continue and make more. The various manufacturers' associations, such as the Association of Manufacturers of Vacuum Cleaners and the Association of Manufacturers of Washing Machines, can do this work equally with the National Electric Light Association, and in many cases they would be willing to do so, so that all the N. E. L. A. committee would have to do would be to get in touch with such manufacturers' associations and explain to them the desirability of starting such work.

REPORT OF ELECTRIC RANGE DIVISION.

Practically all phases of the electric range business have been covered by reports of previous range committees in a very thorough and able manner, according to the report prepared by Chairman C. O. Dunten, Central Illinois Public Service Co., Springfield, Ill. These previous reports, while not reflecting the actual conditions now existing and which probably will continue to exist during the greater part of 1921, still are fundamentally correct, and can be used as a general guide by central stations which are considering entering the electric range field.

The growth of the electric range load in this country during the last 4 yrs. has been quite rapid, but not as rapid as the lucrativeness of the business warranted. The Society for Electrical Development is sponsor for the information that 3600 communities had a cooking rate in effect in 1917, 5000 in 1920 and 6000 in 1921, out of a total of 13,733 communities having electric service available. While the reasons for the apathy on the part of this large proportion of central stations toward this very lucrative source of revenue could not be definitely determined, it was apparently due to a lack of knowledge of the true facts.

The report of the Division, therefore, has been devoted mainly to collecting and collating authentic information as to new investment required, increases in operating expenses, income and other data from the central stations already engaged in this business, and presenting same in such a simple manner that it will be possible for any central station which is still undecided as to the desirability of this load to determine by a simple computation whether or not it is a desirable load under its own local conditions.

Some general suggestions as to the latest practice of merchandising electric ranges is also given which may be of benefit to the central station in beginning this work. Considerable space is also devoted to the heavy duty loads such as commercial electric bake ovens and hotel and restaurant equipment. This field is especially attractive to the central stations and has not received the attention in the past that its importance deserves, according to the report.

A more complete report of the activities of the Electric Range Division will be printed in an early issue of ELECTRICAL REVIEW.

Electric Vehicle Bureau's Report Divided Into Various Sections.

The activities of the Electric Vehicle Bureau during the past year were covered in the report prepared by Chairman E. S. Mansfield, Edison Electric Illuminating Co. of Boston, and presented at a meeting of the Commercial National Section Wednesday afternoon, June 1. This report was divided into the following sections: Report of Comparative Data Committee; report of Electric Vehicle Exhibitions Committee; report of Garage and Rates Committee; report of Legislation Committee; report of Transportation Engineering Committee, and report of Insurance Committee Representative.

REPORT OF COMPARATIVE DATA COMMITTEE.

A special committee, known as the Comparative Data Committee, was appointed Oct. 7, 1920, to undertake ways and means of getting together statistics on the cost of operation of electric vehicles as compared with the cost of the operation of other forms of trucking, according to the report of Chairman F. M. Feiker, McGraw-Hill Co., New York City. The committee was instructed to collect this information from users of electric trucks and to assemble it in such form as would make it available as an argument to prospective users as to why they should purchase electric trucks.

REPORT OF ELECTRIC VEHICLE EXHIBITIONS COMMITTEE.

This committee was formed to encourage and promote electric vehicle shows at which manufacturers of street trucks, passenger cars, industrial trucks, batteries, charging boards and manufacturers of accessories could exhibit their wares. The report of the committee prepared by Chairman Charles R. Skinner, Jr., New York Edison Co., stated that it is the intention to have these shows held in such localities as would prove beneficial and adaptable.

REPORT OF GARAGE AND RATES COMMITTEE.

The electric vehicle as it is known by the general public, and the electric vehicle as it is understood by the men of the industry which gives it

birth are vastly different things, according to the report prepared by Chairman Charles R. Skinner, Jr. When the two ideas become one, success will have been assured, but this condition cannot be brought about except by approaching the situation from the proper angle—the viewpoint of the prospective purchaser. Aware of this, the Garage and Rates Committee has endeavored to search out those facts which most decisively tend toward the desired result. In making the necessary investigations the subject naturally fell into three distinct lines of inquiry: The standpoint of the central station; the owner and possible user, and those who might wish to invest capital in garages. The promotion of the electric vehicle industry hinges upon these three and depends most of all upon the first and last, for from the first must come active foresighted support and from the last must be derived the funds wherewith to enlarge old and erect new housing structures.

Report of Legislation Committee.

The report of Chairman Day Baker, of Boston, referred to various laws introduced in the different states affecting electric vehicles. The committee requested that each and every member of the National Electric Light Association forward to the chairman of the Legislation Committee all information as to proposed legislation in their states which might affect the operation of motor vehicles.

Report of Transportation Engineering Committee.

The three purposes of the Transportation Engineering Committee touched upon in the report prepared by Chairman F. M. Feiker are, first, to gather comparative data from manufacturers on costs, a part of the committee work which has been broadened by the Comparative Data Committee; second, to take an inventory of service and methods used by different central stations in promoting the electric vehicle locally, and third, to continue the survey of educational institutions for the object of bringing before them various ways in which electricity serves in motor transport. In the educational field it is worth recording that the Yale University, since the committee's last report, has definitely committed itself to a chair of transportation engineering, and that such a chair has been established under the bequest of Lord Strathcona.

Report of Insurance Committee Representative.

H. P. Hood, Insurance Committee Representative, advised in his report that under the present existing schedule of the Automobile Underwriters' Conference full coverage on an electric truck can be purchased at about 14% less than the same coverage on a gasoline truck. Feeling this differential is not equitable, the Electric Vehicle Bureau requested the Insurance Committee of the National Electric Light Association to negotiate with the Society representing the insurance companies for a further reduction in rates as applied to the electric truck. The National Insurance Committee agreed to make this request and appointed a committee to gather and furnish data. A member of the Electric Vehicle Bureau is also a member of this committee as its representative.

Committee Recommends Higher Compensation Be Paid to Salesmen.

As a result of a survey embracing 99 corporations operating in as many cities with a population of 100,000 or greater the Committee on Compensation of Salesmen in its report prepared by Chairman L. R. Wallis, Edison Electric Illuminating Co. of Boston, and presented at a meeting of the Commercial National Section Wednesday afternoon, June 1, recommended that "With the view of increasing the earning capacity of the salesmen, where it is desired to secure any special class of business—in short wherever it is desirable to intensively promote the sale of any particular class of service or appliance—that the member companies resort to a commission in addition to a salary to stimulate, encourage and further compensate the salesman, thus enabling the companies to attain the desired results with more and greater success at a lower total cost than they could hope to secure on a regular straight salary basis."

It is believed that this will foster continuity of service and prevent salesmen being attracted to other fields.

How Salesman Can Add to Power Load Through Medium of Handling Equipment.

"Selling Electric Power as a Service Through the Medium of Material Handling Equipment" was the subject of a paper by O. W. Stiles, of the Lakewood Engineering Co., Cleveland, and presented at the meeting of the Electric Vehicle Bureau of the Commercial National Section Wednesday afternoon, June 1.

The author stated that last year the consumers of the United States paid out for purchases $88,660,000,000. It has been estimated by authorities that of this expenditure about one-third, or a total of between $25,000,000,000 and $30,000,000,000, can be traced to inefficiency and preventable wastes of some kind in our methods of handling materials in transfer from producer to consumer. Can you visualize the effect on production and the cost of commodities if this immense waste were eliminated?"

After indicating the subdivisions under which mechanical handling equipment may be classified and the functions of each, the author points out that "mechanical handling equipment can often be made the entering wedge for very large power loads. It may be interesting to know that the tremendous energy purchases of the H. C. Frick Coal Co. from the West Penn Power Co. started with the installation of one electric larry car for charging coke ovens, on which the minimum rate was $7.50 a month and on which the consumption never exceeded this rate.

"A Minneapolis steel machinery company is buying $84,000 worth of electric power a year, because it finds that it saves in the neighborhood of $30,000 a year by so doing. It also finds that the use of a complete system of electric storage battery trucks, tractors and trailers for handling material through the plant saves it $280,000 per year, with an expenditure of $1200 for electric energy. Consequently, electricity and its appliances are saving that company $310,000 per year instead of $30,000. Deere & Co., by installing

overhead carriers, 12 tractors and the necessary trailers, two electric cranes and conveyors, saved 360 men and approximately $432,000 per year."

After giving other notable examples of the advantages of the mechanical handling of products he closes with the statement that "the central-station salesman who shows a customer how the work of 10 men can be done with mechanical handling equipment at an expense including overhead, current and maintenance equal to two men is rendering a service by showing him better and more economical methods, and at the same time is broadening his field for the sale of his own commodity and better still is selling sales, which after all is only showing the customer how to use a commodity to better advantage and make more money for himself."

All Employes Should Be Trained in Service Relations With Customers.

"Commercial service and relations with customers is a field which should be fruitful of valuable results and," said the report of Chairman L. A. Coleman, United Light & Power Co., New York City, "all the work of the Public Policy Committee and all the money spent in advertising campaigns seeking the good-will of the public, is lost unless it is supported by the employes and executives of the member companies.

"The employe should be so educated that he will feel the responsibility which is his when dealing with the customers, and the executives should be shown that red tape, antiquated systems of application routine, drastic and imperious collection methods, inaccurate billing and inattention and lack of courtesy in handling complaints are the chief causes of disagreement."

The report said that officials who fail to recognize these facts and see to it that employes who come into contact with the public observe them, are neglecting an important factor in the success of their concerns.

Lighting Sales Bureau Has Largest Program in Commercial Section.

Development of electric illumination in all its varied phases—lighting of homes, stores, offices, factories and streets—has progressed rapidly during the past year, according to the report of the Lighting Sales Bureau of the Commercial National Section, prepared by Oliver R. Hogue, of the Commonwealth Edison Co., chairman.

"There has been a notable movement toward the adoption of higher standards of lighting both as to intensity and quality," said the report. This movement has not been limited to industrial installations but has been largely in evidence in other fields, as in offices, stores, homes and streets. There has been an important contribution to progress by a number of new devices and by improved modifications of previously used equipment. Such developments are directed chiefly toward less glare, ease of maintenance and cleaning and improved appearance.

Higher intensities call for better eye protection, and the makers of lighting accessories are taking cognizance of optical hygiene in furnishing proper types of reflectors, globes and bowls, and in taking advantage of the different types of lamps.

Colored effects have been widely adopted in billboard displays and printed advertising matter, says the report. It has been common knowledge that interesting and attractive effects were procurable in show windows through the application of colored light, and different experimenters and window dressers have secured pleasing results by specially made colored screens. During the past year color-screen equipments adapted to standard show window reflectors have been produced.

The report discussed industrial lighting at length and, in pointing out that economies of production have demanded the utilization of every reasonable means to produce more and better goods at less output cost, showed that improvement of illumination in factories increases output of manufactured materials, decreases percentage of defects and spoilage, lowers accident rate and reduces injuries, lessens eye-fatigue and improves health, improves morale through improved environment, lessens supervision and labor turnover, reduces unit costs of production, possesses advertising value and bespeaks prosperity and good management.

The report reviewed in detail development of "White Way" street lighting throughout the country during the last year. It described and illustrated ornamental fixtures and spoke of the "white ways" lighted during 1920 at Los Angeles and at Saratoga Springs, N. Y. It also outlined the following advantages of "White-Way" lighting to a community: Increases business on streets installed, attracts out-of-town buyers, creates psychological impression of thrift and progress, lessens overhead wires, advances civic pride, assists fire and police departments, decreases crime and robbery, shows progressiveness of city administration, promotes other improvements, attracts industries, stabilizes or increases real-estate values, facilitates congested traffic, improves sanitary condition of streets and establishes a new level for all lighting.

Incidental to the program of the Lighting Sales Bureau, J. E. North, commercial agent of the Cleveland Illuminating Co., gave an instructive description of a recent "Better Lighting" campaign in Cleveland.

Because of the length of the program and the inability of the members to adequately discuss reports in the limited time assigned, the Bureau took action seeking the arrangement by the Executive Committee for an annual midwinter meeting.

Facts Presented in Report of Industrial Lighting Division.

Emphasis was laid on the fact that most of the advantages of artificial lighting are the result of not merely "lighting," but of "good lighting," in the report prepared by G. B. Regar, Philadelphia Electric Co., division chairman.

The duty devolves upon the producer of electrical power to make its consumption attractive and easy. Clouding illumination with super-technical terms, and generating a spirit of vagueness and fear in the consumer's mind is certainly responsible for much of the reluctance to purchase and use lighting devices. Moreover, no merchandiser can afford to sell inferior goods, least of all to neglect its proper installation and maintenance, lest the disgruntled customer merely express his dissatisfaction by not spending money for either

good or bad lighting. Constantly acquainting the consumer with the best features of lighting and explaining the many advantages of good, better and best illumination will develop the industry and will lead to such installations as leave in the mind of the consumer the conviction that he is securing advantages from good lighting far beyond his actual cash investment.

The report further says that in a great many manufacturing processes the power consumption is proportional to the amount of finished product, and this in turn is proportional to the speed with which the operators perform their tasks; and again this speed is proportional to the operator's physical and mental condition. Adequate light is one of the most important factors in producing good physical and mental conditions on the part of the operators and it, therefore, results in increased power consumption.

A more complete presentation of this divisional report will be given in an early issue of ELECTRICAL REVIEW.

BIBLIOGRAPHY PRESENTED BY DIVISION ON LARGE BUILDINGS.

The lighting of large buildings was well covered in a clear and concise manner in the report prepared by Chairman F. A. Gallagher, Narragansett Electric Lighting Co., Providence, R. I., the various classes of buildings being tabulated together with the classification of rooms and a designation of the character of illumination best suited to each. Absence of glare was specified as important in almost every case, with other requirements suitable to the individual needs. Certain conditions were shown to need local lighting while many places were indicated as best served by general illumination. A bibliography of information on various installations was included as a part of the report.

RESIDENCE LIGHTING DIVISION GIVES DEFINITE WIRING PLANS.

Perhaps the greatest good will come from cooperation of the contractor, the dealer, the builder, the architect, the central-station representative, etc., in encouraging adequate wiring and the proper installation of fixtures and lamps, according to the report presented by Division Chairman M. Luckiesh, National Lamp Works of General Electric Co., Cleveland.

The sale of portable lamps creates a need for additional convenience outlets and thereby attacks inadequate wiring from another angle. Such lamps should be featured in displays and in special sales. Lighting fixtures for the high-efficiency gas-filled lamp should be designed and displayed.

Every household laundry is a potential possibility for the installation of a 75 or 100-watt mazda C-2 (daylight) lamp. This lamp can be emphasized for the sewing room, for the kitchen, for the children's room where they paint with water colors, and in some cases for reading lamps. Other type C lamps can displace lamps of lower wattage of the older type in many cases.

The charm of tinted light should be emphasized by demonstration. Consulting service should be established wherever possible so that the householder may receive information but the information should be authoritative.

Tabulated data indicated that in New York City the average apartment contains 20 lamps of "average 40-watt" rating. In Bloomfield, N. J., the average is 25 lamps of "average 40-watt" rating. In Los Angeles the average is 40 lamps per residence. Diagrams indicated the various outlets required to adequately wire a house.

A more complete presentation of this valuable report will be printed in the next issue of ELECTRICAL REVIEW.

HIGHER WATTAGE EMPLOYED IN LAMPS FOR SIGN SERVICE.

One of the outstanding developments in the electric advertising business in 1920 was the introduction of higher wattage lamps in signs and displays, according to the report prepared by Division Chairman H. I. Markham, Federal Sign System, Chicago. Four years ago the use of 25-watt lamps in electric signs was the exception; now in many of the large cities there are a very considerable number of signs using lamps of 75 and 100 watts. A movement inaugurated within the past year toward the use of higher power lamps in electric sign service opens up a large potential field, both in the design of new signs and displays and in increasing the advertising power and effectiveness of signs already operating. Up to about a year ago sign designers had taken advantage principally of form, color and motion in obtaining novel and striking effects and had, curiously enough, made little use of the possibilities of higher intensity and brilliancy in the light units. This new movement toward the use of larger lamps means not only brighter and better signs, but more light on the streets and a larger power demand and increased revenue for central stations.

STORE LIGHTING DIVISION GIVES RESULTS OF INTENSIVE STUDY.

Comprehensive survey made of lighting conditions in stores in Chicago—there are 23,000 retail establishments in the city—brought out the fact that only 28% of the stores have an intensity of 5 foot-candles or better, and only 6% have intensities ranging from 8 to 12 foot-candles, according to the report submitted by Division Chairman James J. Kirk, of the Commonwealth Edison Co., Chicago. That means 11 out of every 12 stores offer opportunities for increasing central-station revenues without increasing their investment cost. It means that, if all the stores in Chicago that have intensities below the low standard of 5 foot-candles were to be brought up to that standard, it would bring the central-station company of that city an annual increase in revenue of $1,192,320.

In an early issue of ELECTRICAL REVIEW there will be printed a more complete review of the Store Lighting Division report by Mr. Kirk.

MUCH PROGRESS SHOWN IN REPORT ON STREET AND HIGHWAY LIGHTING.

W. D'A. Ryan, of the General Electric Co., Schenectady, N. Y., was unable to be present at the convention to present his report for the Division of Street and Highway Lighting, of which he was chairman, and the report, from which the following extracts are taken, was presented before the Lighting Sales Bureau of the Commercial

National Section by A. F. Dickerson, of the General Electric Co.

"There are various methods of promoting the installation of ornamental lighting systems, but the most successful has been through local improvement associations or commercial clubs. Municipalities are as a rule reluctant to consider such lighting until there is a publicly expressed demand for it.

"In a number of states there are existing laws which permit the establishment of assessment districts for the purpose of taxing abutting property for the installation and maintenance of special lighting. In such cases, usually 51% of the frontage involved must be signed up in order to make a petition effective. Street lighting improvement acts have generally assisted the progress of ornamental street lighting and where available should be used. The assessment becomes a taxation and the contract is between the city and the central station, which is desirable. Voluntary subscription plans are much used and are often successful. Care should be taken, however, that the central station is protected against possible future loss.

"The practice of entering into contracts with individual merchants or property owners generally has been satisfactory. Assuming the street is initially fairly and evenly illuminated, which is seldom the case, in the course of a few years many contracts are cancelled, leaving blanks in the illumination effect and unproductive equipment in the hands of the central station. The commercial expenses of such systems are always excessive. Where ornamental lighting is installed in residential sections the abutting property owners in most cases should pay for the installation and the city the maintenance expenses. Often the same plan has been successful for the ordinary 'white-ways.' The 'intensive white-way' is, strictly speaking, a commercial proposition and both the installation and the major portion of the maintenance expenses should be borne by the property owner or merchant directly benefited. The exception would be a resort city where the whole community would profit by the advertising received.

"In concluding this report it is recommended that the future work of this Division embody the promotion of the 'City Beautiful' idea of ornamental street lighting. Street lighting systems should form a part of the architectural development of every community and more thought should be given to the artistic design as well as the efficiency of both fixture and standard.

"A study should be made of existing 'Street Lighting Improvement' Acts with the idea of giving assistance to those desiring to have such laws passed in states where they are not now available. Encouragement should be given the movement to light our most congested highways and observations and records made of the results of such installations."

Public Relations National Section Session

As announced elsewhere in this issue of ELECTRICAL REVIEW, Past President Martin J. Insull, of the National Electric Light Association, has consented to act as chairman of the Public Relations National Section for the ensuing year. This Section has a vital work to accomplish and the selection of Mr. Insull by President-Elect Bump may be taken as an indication of unusual activities to follow.

There was but one session of this Section but it drew a larger number of members than any of the other meetings except the General and Executive Sessions. It included an address by Chairman J. E. Davidson, report of the Manufacturers' Advertising Committee, report of the Public Utility Information Committee, an address by Edward N. Hurley on "Do We Know Our Customers," report of the Committee on Public Utility Taxation and Uniformity of Regulatory Laws, report of Committee on Relations with Bankers, report of the Committee on Relations with Regulatory Bodies, and report of Committee on Up-Building the Industry.

Value of Good-Will Advertising Indicated in Committee Report.

"The keynote at Pasadena was Better Public Relations," according to the report of the Manufacturers' Advertising Committee, prepared by Chairman P. L. Thomson, Western Electric Co., New York City, and presented at a meeting of the Public Relations National Section Wednesday afternoon, June 1. The report indicates that "the manufacturers of the industry have been playing a part in the game not limited to applause from the side-line, but have backed up their fine words of praise on the glories and achievements of the operating end of the electric light business by a substantial expenditure of good hard coin of the realm, to the extent of upwards of a quarter of a million dollars, advertising the central station business to the public.

"The public has been the victim of so much misinformation on the economics of utilities and utility rates that we manufacturers have found it easy to write interesting copy, bearing upon the fundamentals of the situation. We have emphasized the essential nature of the service which electric light and power companies render; we have shown that the development of any town is contingent upon a healthy utility, earning sufficient return to be able at all times to attract new capital; we have pointed out the double advantage in customers becoming at the same time security holders; we have glorified electricity and electric service for its all embracing usefulness in domestic and business life; and in so doing, we have emphasized the central station as the purveyor and dispenser of this service to the public."

Forty-seven manufacturers contributed space for this good-will advertising with an aggregate circulation of nearly 10,000,000.

"The manufacturers are willing to continue to play their part," continued the report, "but the outstanding fact which I want to leave with you is that you central-station men are not taking full advantage of the help which is being offered to you. The simultaneous printing of these national advertisements in your local newspapers over

your own companies' names ought to be the most valuable circulation to get; and yet, out of the entire membership of this Association, less than 200 central stations are securing this local newspaper tie-up."

Report Gives Pointers on Up-Building the Electrical Industry.

The report of the Committee on Up-Building the Industry, prepared by Chairman F. R. Coates, Toledo (O.) Railways & Light Co., and presented at a meeting of the Public Relations National Section, Wednesday afternoon, June 1, contained a strong recommendation that public service corporations should impress upon every employe, whose duties required direct contact with the public, the favorable influence and value to the company which courtesy represents. The courteous handling of all transactions with the general public builds up a favorable sentiment that reacts to advantage when a public utility must go before the people. Besides this, considerate and courteous handling of the public largely eliminates the small, irritating and needless difficulties of business transactions that consume time and cost money to smooth out.

A public utility should demand a fair profit. Stockholders in these necessary and desirable corporations should not be expected to give their financial support with a less return than could reasonably be expected from other similar investments.

It is desirable to have local stockholders and this is a rapidly growing condition. Employes should be encouraged to invest their savings in the properties of the company that employs them. It is not uncommon, said Mr. Coates, to associate the financing of a public utility with Wall Street while, as a matter of fact, a comparatively small volume of these securities are actually held there. Where local capital dominates, the utility usually finds less opposition.

Fair Treatment Accorded by Regulatory Commissions When Facts Are Presented.

R. H. Ballard of the Southern California Edison Co., chairman of the Committee on Relations with Regulatory Bodies, of the Public Relations National Section, in reporting upon the work done by this committee expressed the thought that "commission" regulation was to be desired in preference to domination by unscrupulous politicians.

A meeting had been held at Washington, D. C., and he found that where frank, open discussions of questions were had fair treatment was accorded by the commission. He believed it a serious mistake to go before a commission with any other thought than to present all the facts. Members of commissions recognize the fact that a community suffers when its public utilities are incapable of rendering good service and in order to render good service the utility must spend money. It cannot be expected that public service corporations will extend their lines and do other things to improve the service when rates are inadequate to pay dividends which are necessary to attract capital.

Commissions recognize the fact that sound financing is necessary and if companies are honest in their dealings with the representatives of the public they are sure to receive fair treatment.

Technical National Section Sessions

Officers of the Technical National Section for the ensuing year were elected as follows: Chairman, N. A. Carle, Public Service Electric Co., Newark, N. J.; first vice-chairman, H. A. Barre, Southern California Edison Co., Los Angeles; second vice-chairman, A. H. Lawton, Consumers Power Co., Jackson, Mich.; third vice-chairman, R. T. Schuchardt, Commonwealth Edison Co., Chicago; executive committeemen for 2 yrs., O. B. Coldwell, Portland Railway, Light & Power Co., Portland, Ore.; W. K. Vanderpoel, Public Service Electric Co., Newark, N. J., and C. F. Herschfield, Detroit.

Chairman I. E. Moultrop, at the opening session of this Section, reviewed the work of the Section during the past year and announced the amicable relations which have been established between central-station companies and telephone people for the settlement of inductive interference troubles. Mr. Moultrop's report to the convention is summarized under the head of the General Sessions abstracts.

Committee Report Describes Developments in Electrical Apparatus.

Circuit-breaker design and operation featured the report of the Electrical Apparatus Committee of the Technical National Section of which R. F. Schuchardt, Commonwealth Edison Co., Chicago, is chairman. Generating stations, transformers, substations, motors, special apparatus, and standardization of service voltage were also covered in detail. Considerable attention is at present being given by some operating companies to the possible provision of closed-circuit ventilation for generators of comparatively large capacity, with the expectation of obtaining one or all of the following improvements: (1) Cleaner air and therefore cleaner windings, resulting in lower operating temperature and longer life of insulation; (2) decreased liability to internal fire because of reduced quantity of dirt carried into the windings and reduced damage because of lessened ability to sustain combustion, and (3) possible economies in diverting heat due to generator losses into the boiler-feed-water system. In this system of generator ventilation the air is circulated through a closed system of ducts and cooled by passage through water sprays or through coolers of the radiator type.

The Narragansett Electric Lighting Co. has made changes on a 20,000-kv-a. unit so that the closed-circuit system may be used with heat transfer to boiler feed water by means of the spray method. Another installation of the closed-circuit system is to be made by the Hartford Electric Light Co. during the year on two 20,000-kw. gen-

erators which will be installed in a new station soon to be placed in service. The two 30,000-kw. units in the new Calumet station in Chicago are to have this system of ventilation.

In connection with the section of the report dealing with circuit-breakers it is pointed out that no rating based on one particular duty cycle, such as opening twice with a 2-min. interval, gives sufficient information to the operating engineer who may desire to use the breaker for several different classes of service, thereby necessitating his resorting to the manufacturers for information as to the rating on some other duty cycles than the standard. This means delay in making selection or comparison of different breakers. It is also clear that the ideal way of showing the interrupting capacity capabilities of a breaker would be to have curves or tables which would give the currents which the breaker would interrupt for various numbers of openings and for various time intervals between openings.

The Transformer Subcommittee recommended elimination of 1 and 2 kv-a. transformer ratings in voltage classes of 4600 and below, with the substitution of a 1.5 kv-a. rating. Steps have been taken to standardize the transformer oils made by different companies so that such oils may be substituted for each other with safety.

Increasing use of automatic d-c. substations was indicated in the report of the Subcommittee on Substations, and numerous such installations were briefly mentioned. The few cases of failure of high-voltage equipment reported serve to emphasize the advantages of more liberal spacing and more favorable location of certain kinds of high-voltage equipment, which are usually possible in outdoor substations as compared to indoor station practice.

Opinion on the relative merits of 40 deg. and 50 deg. motor ratings is divided, but the majority opinion favors a motor rated on a 50-deg. temperature rise, according to the report. At the committee meeting in New York City, held in January, the following resolution was adopted: "Resolved, that it is the sense of this committee that in the manufacture of motors the rating should be based on the maximum temperature limits for fibrous insulations, as stated by the A. I. E. E. in its Standardization Rules."

The tendency towards standardization of service voltage is becoming quite marked, 85% of all lamps sold in the United States being rated within the range of 110 to 125 volts. A rating of 110 volts is most popular, with 51% of all operating companies using this rating.

Electric household appliances are, in general, designed to operate successfully when the impressed voltage does not vary more than 5% above or below the rated voltage. Standard 110-volt electric household appliances should therefore operate successfully on service circuits whose voltage is suitable for the application of either 110 or 115-volt lamps. Motors are usually designed to operate successfully with impressed voltage not more than 10% above or below normal, but not necessarily with the same performance characteristics. In general, it is preferable to impress on a motor a voltage somewhat above rather than below normal.

From the above it will be noted that, whereas 110-volt motors will operate successfully whether the service line voltage is adjusted to meet the requirements of the 110 or the 115-volt lamp, they will give their best operating characteristics in the latter case.

Tentative Recommendations for Standard Service Voltage.

Should the conclusions as outlined by the committee be accepted finally, it is planned to present recommendations in the following form:

(1) It is recommended that a standard practice be adopted for the selection of such average service line voltage that the proper average voltage will be delivered to current-consuming devices rated as follows:
   (a) Lamps having a voltage rating of 115.
   (b) Electric household appliances having a voltage rating covering a range of 110 to 120.
   (c) Motors having a voltage rating of 110.

(2) It is also recommended that recognized departures from the above standard practice be the selection of such average service line voltages that the proper average voltage will be delivered to current consuming devices rated as follows:
   (a) Lamps having a voltage rating of 110 or 120—this latter for existing systems of that voltage.
   (b) Electric household appliances having a voltage rating covering a range of 110 to 120.
   (c) Motors having a voltage rating of 110 volts.

Many special applications of electrical apparatus were cited in relation to various industries. Woodworking, paper manufacture, metallurgy, textile work, mining, the railroads and the motion-picture industry all were shown to have extensive special applications of electrical power, with still greater room for new developments.

Standardization of Oil Circuit-Breakers Recommended.

Use of the wireless telephone in general operating practice proved to be of considerable general interest. Alex Dow, Detroit Edison Co., and W. L. Abbott, Commonwealth Edison Co., Chicago, however, made it evident that such a form of communication was not at the present time satisfactory for general use, although it may be available under certain conditions when other lines of communication have failed. R. F. Schuchardt recommended active work by large committees in order to secure the greatest amount of good from the actual work done, and to have a large number of men improve their own personal understanding of equipment and developments by maintaining a personal contact with the changes proposed and experimented with. He, together with other speakers, recommended the standardization of oil circuit-breakers. By properly standardizing these devices, it was pointed out, much more could be secured for the money spent. Overtaxing circuit-breakers as a result of system extensions was cautioned against. A resolution looking towards the provision of power-factor compensators with induction motors was offered by W. C. L. Eglin, Philadelphia Electric Co., and was passed by the section.

H. R. Summerhayes, General Electric Co., Schenectady, N. Y., called attention to the fact that reactors were now being built with great mechanical strength to guard against failure, forces of 200 lbs. per in. of conductor being provided for. In discussing the use of nitrogen or CO_2 as a generator cooling medium, to guard against fires, he stated that the use of CO_2 as a fire extinguisher was practical when employing a closed circuit ventilation system. W. L. Abbott suggested the possible use of flue gas as a fire extinguishing medium. Mr. Summerhayes said further that circuit-breaker oils had not been standardized, only transformer oils having been covered so far. He pointed out the wisdom of having a single service voltage standard.

Troubles in connection with the use of motor-driven auxiliaries were cited by R. J. C. Wood, Southern California Edison Co., Los Angeles. He called attention to the fact that troubles common to almost every generating system had made it necessary to resort to the emergency use of the standby steam auxiliaries at the Long Beach (Cal.) plant, low voltage, low frequency and overloads on the system being given as specific causes for the use of the steam units.

B. G. Jamieson, Commonwealth Edison Co., Chicago, in discussing automatic operation, called attention to the fact that no attempt had as yet been made to handle lines automatically. In speaking of circuit-breakers he pointed out the desirability of so rating and installing such equipment that it would be able to function at its rated capacity and still be in condition for additional service. This point was covered by other speakers, and it seemed evident that there is a desire to have circuit-breakers so rated that the purchaser may know what may be expected of them under varying conditions of service. Mr. Jamieson pointed out the necessity of rugged reactor construction. These devices are installed to protect the plant, and if they should be so weak as to fail in service their cost then would represent a more than useless waste of money. Auxiliary equipment, he said, must be kept in service, and the elimination of protective devices from motor-driven auxiliaries only partly solves the problem.

F. C. Hanker, Westinghouse Electric & Manufacturing Co., Wilkinsburg, Pa., reviewed methods of fighting and preventing internal fires in machines. He pointed out the advisability of providing suitably large circuit-breakers for use in connection with auxiliary devices. The use of a starting bus was said to be superior to the use of individual compensators in station practice. He stated that much data was being gathered in regard to circuit-breaker capacity and performance, and that the information obtained would be available at a later date.

Report on Prime Movers Shows Progress in Design and Operation.

Much progress in design and operation during the past year is recorded in the report of the Prime Movers Committee of the Technical National Section, of which N. A. Carle, Public Service Electric Co., Newark, N. J., is chairman. The efforts of manufacturers during the past year have been directed toward improvements in a number of details affecting reliability and operating efficiency of turbines. The maximum size of single-cylinder unit is still limited to 45,000 kw., and there has been no appreciable change during the year in steam pressures and temperatures, although it is felt that higher pressures and temperatures are a possibility for future application. Turbine lubrication is receiving a great deal of attention. On account of the severity of conditions imposed by steam turbine service and its complicated requirements the solution is difficult for both the manufacturer and the oil refiner. Wide variation in the grades of turbine lubricants offered and the disagreement among lubricating experts as to the ability of various oils to fulfill requirements has led the committee to offer for consideration a tentative general specification for turbine oils. As regards oil purification the continuous system and the continuous by-pass system are the most effective methods. Whatever method is used the impurities should be continuously removed, as the impurities cause the emulsification, sludging and acidity which results in rapid deterioration of the oil.

A new record for the United States as regards boiler sizes was established during the past year by the installation at the Ford Motor Co. plant of four boilers each rated at 2647 hp.

In addition to the tendency toward large size boilers, pressures and superheats are gradually being raised, although 300 to 350 lbs. and total temperatures of 600 to 650 deg. F. seem to be as high as boiler designers are willing to go at the present time.

Stokers and Grates Adapted to New Conditions.

The continued high cost of economizers has led boiler manufacturers to develop a boiler with a higher tube bank to get at least part of the saving which could be realized with an economizer.

The excessive cost of high-grade coal and the consequent necessity for utilizing certain low-grade coals have forced manufacturers to adapt present stoker designs to meet the new conditions. A very marked activity along these lines has been noted during the past year. The successful application of forced draft to chain grate and conveyor type of stokers is of considerable importance because it opens up to this type a field which has heretofore been pre-empted by the underfeed stoker. The packing and arching over of coal in stoker hoppers, resulting in irregularity of coal feed and necessitating the use of expensive manual labor for its correction, can be practically eliminated by the use of power-operated agitators installed at the base of the hopper.

Successful application of a balanced-draft system to control air pressure over the fire on underfeed stokers is reported by a member company. The particular system used makes it possible to obtain an extremely light suction in the furnace, securing a better distribution of air and less infiltration of excess air. On the principle that the supply of coal and air are proportional to the rate of steaming, several manufacturers are offering systems which control stoker speeds, and the speeds of fans and other auxiliaries, through a master controller actuated by differences in steam velocities. None of these systems has been in service long enough to justify their unqualified endorsement.

The diminished incentive to use economizers on account of their present high cost is partially offset by other considerations, such as excessive coal prices, the high flue-gas temperature resulting from operation at higher total steam temperatures and the fact that both economizers and fans have been greatly improved and their operation is much more satisfactory than that of a few years ago.

Relatively few changes have been made in the design features of cast iron economizers, but manufacturers of steel tube economizers report many new developments and a number of prominent manufacturers have recently entered the field. Among member companies considerable interest is being shown in the wrought-steel type on account of the higher boiler pressures now in use or contemplated, and it is probable that the respective spheres of the two types will be pretty well marked out within the next few years.

Power-Station Auxiliaries Play Important Part in Economy.

It is quite generally accepted that the most economical methods of maintaining heat balance in the larger stations are the house turbine in combination with a heater condenser, and the straight electric drive with bleeding of the main units for feed water heating. One company in discussing the question points out that the use of a house turbine lowers the cost of auxiliary switching equipment and, what is more important, reduces short-circuit currents on auxiliary circuits.

An investigation of the literature on the Prat or Evase system of induced draft indicates that this system is effective at boiler ratings up to 150%, but that at higher ratings the induced draft fan is more suitable. The Prat system is used quite extensively abroad, due to special considerations, but in the United States, even at the moderate ratings for which the system is adapted, the cheapest means of obtaining draft is usually by the erection of a stack.

The single-stage high-pressure feed pump for pressures in the neighborhood of 400 lbs. has been developed in England with apparently satisfactory results. In general American manufacturers still hold to the practice of limiting pressures to 100 lbs. per stage, but one American manufacturer is now building the single-stage pump and has every confidence that it will meet all service requirements.

Some Important Coal and Ash Handling Problems.

Use of heated sheds or tunnels for thawing out cars of frozen coal is not being adopted to any extent by large companies on account of the time required and the large investment charges imposed by this system. Car dumpers and pneumatic chisels seem to offer an effective means of unloading at a very much lower cost.

As regards coal crushing apparatus, it is felt that manufacturers have developed crushers of large capacity at the sacrifice of the uniformity of the crushed product. A decrease in the peripheral speed of the rolls would probably remedy this trouble to some extent. Automatic coal samplers have not met with entire success on account of the difficulty of securing a representative sample. A great deal of care should be exercised in the selection of a sampler to meet individual conditions.

Disposal of ashes by sluicing appears to be gaining in favor. A combination of sluicing troughs and sand pumps is reported to be in successful operation at the Lake Linden Plant of the Calumet & Hecla Mining Company.

Boiler and Turbine Room Instruments.

Development of new types of boiler and turbine room instruments during the year appears very promising, although no complete data are at hand covering the performance of the new types under conditions of actual operation. The following new instruments are offered by manufacturers: (1) Recording pyrometers for indicating boiler furnace temperatures. (2) Combined Co_2 and CO recorders. (3) Multiple type draft gauges. (4) Flowmeters for indicating small rates of flow of liquids under pressure, such as bearing oil or jacket water. (5) Meters based on the principle of the alternating current potentiometer for detecting condenser leakage.

Higher Steam Pressure Being Adopted.

Modern plants are using high pressure steam temperatures between 600 and 700 deg. F. At the present time lack of knowledge of the properties of materials and of the possibilities of turbine design seem to limit temperatures to a maximum not much in excess of 700 deg. F. Under these circumstances designers are considering the use of higher pressures without increasing the total temperature.

It is obvious from a review of the theoretical side of the question that real thermal improvements may be expected, with or without a modification of the present cycle, but it is equally obvious that commercial considerations will affect the conclusions arrived at from the theoretical side.

There have been no important commercial developments leading to the use of extremely high steam pressures in this country during the past several years, but this is largely accounted for by the conditions under which industries have had to operate, leaving no room for development work along these lines. The consensus of opinion of American and European designers seems to be that 350 lbs. pressure and 700 deg. F. total temperature are the upper commercial limits at the present time.

Small Steam Prime Movers.

A study of the investment and operating costs of a 200-kw. central station with various types of prime movers installed indicates that at all values of load-factor the lowest total cost per kilowatt hour is realized by the Semi-Diesel engine and the condensing steam turbine, the former having a slight advantage. However, the difference in total cost is so slight that the condensing turbine plant would be preferred on account of its lower first cost.

The calculations indicate that for a plant of this size the lower steam rate which obtains with superheated steam is, in practically all cases, offset by the higher fixed charges and increased fuel

costs; and except in the case of turbines, no net gain is realized by operating the plants condensing.

Contrary to what might have been expected, the production and use of lignite did not receive any great impetus as a result of the acute demand for fuel during the war period, production in the United States having fallen from 10,200,000 tons in 1918 to 8,800,000 tons in 1920. German production on the other hand increased from 110,785,000 tons in 1918 to 123,000,000 tons in 1920.

The lack of expansion in American production is due probably to lack of knowledge how to get efficient results from fuels of this type, as well as to the storage difficulties which are usually experienced.

A number of public-utility plants burning lignite report that operating experience has led to a much better understanding of the problems involved, and there is a general feeling that the difficulties can be successfully overcome.

Review of the Present Pulverized Fuel Situation.

Developments in the field of pulverized fuel indicate a continued interest on the part of engineers in this method of burning coal. The Milwaukee Electric Railway and Light Co. recently put into operation the new Lakeside plant, which will have an ultimate capacity of 200,000 kw. and which is designed for burning pulverized fuel. Eliminating the restrictions imposed by the layout of old stations in changing over from grates or stokers to pulverized fuel equipment the question of high boiler ratings does not seem at all serious. It should be noted that high ratings are being obtained in new plants where boilers have ample combustion space and are designed expressly for burning pulverized fuel.

Present practice in the installation of fuel-oil storage tanks favors the steel tank with steel roof or the concrete tank, the choice between the two being governed mainly by local considerations. The usual sizes are of 55,000, 37,500 and 25,000 barrel capacity. The heating of oil to secure its ready flow through piping systems makes it necessary to secure the best material and workmanship, as leakage of hot oil is dangerous and expensive.

Steam atomizing burners have been in use for a number of years in stationary plants, but it is only recently that mechanical burners have been employed to any extent. It is claimed by manufacturers that the mechanical burners use very much less auxiliary steam than do the steam atomizing burners.

Discussion of Report Brings Out Valuable and Instructive Points.

H. H. Holding, chairman of the Power Sales Bureau, discussing the report, said that in the future power sales would have to be based on the value of service rather than simply on the bare costs to give service. Nicholas Stahl, Narragansett Electric Lighting Co., Providence, R. I., spoke of the effect of fuel prices and contracts on the oil situation in central-station practice. C. M. Larson, Sinclair Refining Co., Chicago, speaking of fuel oils, said that low-gravity oils were to be recommended for furnace use. In the matter of turbine lubrication Mr. Larson pointed out the value of oil specifications, but said that actual tests only would show the final value of an oil for service. He stated that the specifications drawn by the Committee were too complicated for commercial service. Exposure of oil to air, and too rapid cooling of oil over a wide temperature range, works to the detriment of the lubricant. Coffee pipe used in the oil system has been found to be a disadvantage in that it results in setting up acidity.

R. J. C. Wood described troubles from sludging, where the sludge showed a large proportion of iron oxide that had resulted from destruction of the piping system. He pointed out that acidity tests did not show the real danger because of neutralization of acid in its combination with the iron. H. M. Cook, Brooklyn Edison Co., spoke of troubles resulting from brass oil pipes, stating that corrosion resulted from the use of such pipes. Use of a felt bag for straining was said to be valuable in removing sludge from oils. W. L. Abbott, Commonwealth Edison Co., Chicago, told about examination of sludges taken from oil filters, stating that such sludge had been found to consist chiefly of oil and water, it being possible to separate these two constituents by application of heat. However, it is not good practice to attempt to separate these elements. Elimination of water from filter was said to be much desired.

John Anderson, Milwaukee Electric Railway & Light Co., said, in connection with the burning of powdered coal, that the success of the Lakeside plant of his company had met with his expectations. He invited the men at the meeting to visit his plant and see for themselves what had been done. W. J. Sautmyer, Puget Sound Light & Power Co., told of other very gratifying results obtained in burning the lowest grades of fuel in the Northwest. He said that powdered coal had come to stay on the Pacific coast, and that powdered coal would bring boilers into service quicker than with any other fuel. H. D. Savage, Combustion Engineering Corp., New York City, spoke briefly of the great flexibility of powdered coal equipment. F. A. Scheffler, Fuller Engineering Co., New York City, told of the more favorable opinion of engineers relative to the use of powdered fuel. Joseph Harrington, James A. Brady Foundry Co., Chicago, said there were two sides to the question, and that it must be recognized that the mechanical stoker had recently undergone much development. In the end, he said, the cost per kilowatt at the bus was the thing to be aimed at in the operation of any plant. He pointed out that simplification of equipment and reliability were much to be desired in the central station. He questioned the economy of using pulverized coal that was higher in ash than 15%, and expressed a desire to see a comparison made between powdered-coal equipment and a modern stoker installation. He predicted that combustion of bituminous coal at the rate of 100 lbs. per sq. ft. per hr. was to be expected in the near future. Mr. Sautmyer took exception to Mr. Harrington's statement in the matter of the difficulty encountered in burning low-grade coal in powdered form. W. W. Tefft, Consumers Power Co., Jackson, Mich., told of the wonderful reliability of the water-power plants of his company.

EDITORIAL COMMENT

N. E. L. A. Backs Optimism with Work

The greatest convention in the history of the National Electric Light Association was held in Chicago this week. In fact it was the greatest convention in the history of the electrical industry. But its greatness in point of numbers in attendance was of minor consideration as compared with its greatness in point of accomplishment. Optimism is rather a futile description of that spirit which ruled every meeting of the general and sectional sessions and swayed the minds of many hundreds of central-station leaders, their associates and affiliated interests in attendance.

Every face was set towards the immediate future; every mind alert to grasp the pending problems; every will determined to win the goal of success by work. No echo of wartime chaos or subsequent distressing period was heard within the walls of the convention meeting rooms. Only the present bright prospects and the future great development of the industry entered into the messages presented and the discussions that followed.

Organization plans initiated under the capable leadership of R. H. Ballard, president of the National Electric Light Association last year, and successfully carried out under the dynamic direction of Martin J. Insull, this year's president, were productive of benefits which will be felt in the electrical industry for years to come. These benefits were reflected in the carefully prepared and ably presented reports of the Section chairmen and of the various Section committees. It took an immense amount of study and research to develop these reports to the degree of comprehensive authority embodied in them. This was realized when those attending the Section sessions voiced regret that the limited time assigned to the reports did not afford as full a discussion as was desired, and resolutions were drafted in some instances requesting more time for consideration of the subjects or asking for mid-winter meetings of some of the bureaus.

Samuel Insull, president of the Commonwealth Edison Co. and one of the most respected men in the central-station industry, put into expressive words the progressive and aggressive hopes and ideas of his fellow representatives. Mr. Insull's address on "Future Expansion in the Use of Central-Station Power," delivered at one of the large General sessions of the convention, is printed elsewhere in this issue of ELECTRICAL REVIEW because it so aptly sums up the situation confronting the electrical industry and prescribes the most appropriate tonic for its upbuilding.

Another important feature of this year's convention was the presence and participation of representatives of affiliated interests and regulatory power. Without exception these outside interests voiced friendly conception of, and practical cooperation with, the progressive requirements of the central-station companies. Solution of that bane of the electrical transmission industry, inductive interference, became a nearer reality when representatives of the telephone and telegraph industry promised amicable co-ordination of effort in meeting individual problems. The president of the organization of Public Utility Commissioners, as well as individual members of state regulatory bodies, pledged honorable consideration of utility rate problems and a desire to foster the welfare and prosperity of central-station companies.

As the result of the convention just closed the National Electric Light Association enters upon another year of activities with a sturdy stride forward and a confidence in its own important duty of advancing and expanding its own and public interests.

The Rule that Should Work Both Ways

In a recent issue of the Washington Courthouse (O.) *Herald* there appeared the following editorial anent recent rulings on public utility rates by the U. S. Supreme Court:

"The rules of law applying to the rates which public utility companies may charge for electricity, for gas, for street-car service or for any other service furnished by such companies, which have been given their first judicial pronouncement by the Supreme Court of the United States in recent decisions, are nothing more nor less than good common sense, and which sometimes, fortunately, triumphs over legal technicality in the administration of law.

"The court holds that no municipality may insist on a rate contract with any utility company when to permit it to do so would result in the entire or partial confiscation of the company's property. That's a just ruling. There are hundreds of millions of dollars of the people's savings invested in utilities-company securities and those savings must be protected just as the public right to service at fair rates must be protected.

"There is another strong reason—rule of justice—supporting the conclusion of the court. The right of the public, by city council, by state com-

mission or by appeal to the courts, to hold the utilities companies to a small profit is recognized and enforced. The utilities companies are not permitted to make enormous profits because of statutory regulation of their affairs and they are therefore unable to build up huge surpluses to tide them over periods of loss. The same law which controls and hampers them must, in justice, take the responsibility for their relief in time of financial distress.

"In the decisions the court announces that the rule of regulation must work both ways. If the companies are subjected to a sharp check on profit-making the public must, when abnormal conditions arise, assist them to live by relieving the company from the rigid performance of hard contracts.

"Thoughtful people have seen the trend clearly in these matters and have sought to prevent the coming of a deadlock in our local affairs. There has never been any doubt that, if the local utilities company was entitled to relief, it would obtain it, sooner or later, and our city authorities should have recognized that rule. Even before the Supreme Court of the United States made formal declaration of the rule, it was poor business judgment to seek to hold the company, by a technicality, to the performance of a contract which, it claimed, would cause loss. The company should have been given its day in court and its appeal for a compromise listened to and investigated.

"The day has passed when we can shut our eyes and stop our ears to the claims of the utilities companies. The fact that they have become the objects of rigid control by the public makes them also, in a sense, public wards. The deserved suspicion, distrust and even fear, which in former days attached to them has passed away with all, save a few people, who still think it popular to insist that a public utilities company has no rights and that to speak a word in their defense is to be guilty of an impolite act."

Coal

As a nation we may congratulate ourselves that even if the coal situation has been and still is to some extent far from satisfactory, we have weathered the crisis better than many other countries.

In England the situation is certainly deplorable and might easily be described by the less optimistic observers as disastrous. During the war the British colliers, in common with their colleagues engaged in other essential industries, put their wages up to such an extent that Great Britain lost the export markets for coal. Where hundreds of thousands of tons were formerly exported, a mere shipload or two are now being sent.

This is only one more instance of the mistake made by labor in believing that it is always advantageous to grasp the immediate gains made possible by favorable circumstances apart from such factors in the general situation which a broader viewpoint would have rendered obvious.

Two returns have recently been issued by the British Department of Mines which show that government control has not been successful in remedying the evils brought about largely by the action of the miners themselves. The first return deals with the quarterly output, cost of production, proceeds, profit and loss of the coal mining industry as a whole for the quarter ending Dec. 31, 1920. The second is a similar return for the month of January, 1921. The return for the last quarter of last year shows a loss over the whole coal industry amounting to £1,136,324 (say $4,500,000) and in arriving at this figure such items as depreciation and interest on debentures have not been included. That the trouble does not end here is shown by the returns for January of this year. The deficit for 1 mo. only (not 3 mo., as in the case of the previous figure) is £4,889,331 (about $20,000,000).

During this month only one coal field paid its way, the balance being on the wrong side for every other coal field throughout the country. With us it is the consumer who is usually the chief sufferer; in England the government has apparently seen to it that the coal mines shall be the losers during the era of high wages and reduced output.

When Prof. Rowland Discovered the Dynamo

From that day in 1869, when Henry A. Rowland, professor of physics at Johns Hopkins University, completed his dynamo, believed to be the first continuous-current one, to the present year of 1921 there has been an electrical development that must inspire with awe the future historian of American achievement. We trust that the true chronicler of this wonderful period will be a poet of science gifted with eloquent words to portray the fascinating and world-changing results the imponderable electric current has brought about. How it enters into and has changed other methods of everyday life!

It seems to be a fitting moment, in view of the particular interest that centers at this time on the advances in electric lighting, to pause an instant and pay a tribute to this modest scientist of Baltimore whose work, unheralded at the time, had in it so potent an influence on the days that were to follow. We present, therefore, from the ELECTRICAL REVIEW of Nov. 5th, 1889, the following article from the brilliant pen of Dr. Louis A. Duncan, a member at the time, of the

faculty of Johns Hopkins, afterwards president of the American Institute of Electrical Engineers, and one of the most capable of the many students of electricity that America has produced:

ROWLAND'S DYNAMO OF 1869.

To the Editor of ELECTRICAL REVIEW:

My attention having been called to an article lately published in ELECTRICAL REVIEW, on an early dynamo of Prof. Farmer, it has struck me that it would be well to describe a dynamo which I think has never been sufficiently noticed.

It was built in 1869 by H. A. Rowland.

The armature of this dynamo has been lying for some years in a case in the physical laboratory at the Johns Hopkins University; the magnets are missing and the commutator has recently disappeared. Still enough is left to show the principle on which it was built.

The first drum armature on which the windings completely covered the core was in the proposed dynamo of Worms de Romilly, patented in France, in 1866. This machine was wound, however, so as to give only two opposite impulses per revolution, their direction being rectified as in the early shuttle dynamo at Siemens.

Rowland's dynamo was built without knowledge of this, the only resemblance being that in both, the coils completely cover the core. The field magnets were of the upright single horseshoe type, used at present in the Kapp and other dynamos—a form which offers some important advantages.

The armature is of the drum type, the surface being covered with wire, wound on a shell within which is a solid iron core. The wire is wound in six separate coils; the ends of three of these coils are taken to one end of the armature, each coil terminating in the opposite segments of a 6-part commutator. A single pair of brushes bore against this commutator and put in circuit that coil which was in the most favorable position; thus giving a continuous current and cutting out the coils that were adding comparatively little to the e.m.f. The remaining three coils were taken to the other end of the armature, where the current used in magnetizing the field was taken off in the manner described above.

The solid iron core of the armature is mounted on an axle that fits in bearings fastened to the outer shell on which the wire is wound. The core moves freely in these bearings, and it will be seen that the advantages of this arrangement in eliminating losses due to currents induced in the core are very great. Such currents would be in a direction to resist the motion causing them. So the velocity of rotation of the core would only increase until this resistance was equal to the slight friction of its bearings. Instead then of a solid mass of iron revolving rapidly in a strong magnetic field—as in the other machines of that and even of later date—we would have the core rotating slowly and causing little waste.

Such is a brief description of a dynamo built in 1869 by a school-boy. It is not only a great advance over the dynamos of its date—I think we can say it is the first really continuous current dynamo made—but it would compare favorably in efficiency with the machines of 6 or 8 yrs. ago, and I have little doubt that if tested today it would prove more efficient than some of the dynamos used now for electric lighting.

Baltimore, Oct. 25. LOUIS DUNCAN.

Business Men and Utility Earnings

Many people fail to appreciate the immense amount of capital invested in public utilities and the extraordinary efforts utility men are making to secure funds through borrowing or sale of stocks and bonds in order to meet the demand for better and more service, declared Martin J. Insull, of the Middle West Utilities Co., Chicago, and president of the National Electric Light Association, in an address at the recent convention of the Southwestern Geographic Division of the National Electric Light Association at Hot Springs, Ark.

Mr. Insull declared that the average business man will admit that a public utility should be permitted to earn a return of 10% on its investment. He fails to take into account, however, said Mr. Insull, that the average business man will make 10% on his capital and turn it over four and five times each year, making a total return of from 40 to 50% per annum, while a utility will not turn over its capital more than once in every 4 yrs. All the utilities ask is a fair minimum return for the investments of individuals for whom they act as stewards in the interest of the public.

Editors and Public Ownership

A newspaper survey conducted by the Press Service Co. of New York City shows that the American public becomes more and more opposed to government and municipal ownership and operation of public utilities. Out of 5154 questionnaires sent to the editors of the country, 4666, or 86%, gave it as their judgment that the people of their communities were overwhelmingly against city, state or national government competing in business with citizens. The 1919 survey showed 83% of the editors to be of that opinion, indicating that in the past year an additional 3% have swung farther away from a desire to participate in such experiments.

Importance of Thrift

"If the people would practice more thrift and invest a portion of their savings in public-utility stocks and bonds these utilities could make many needed improvements and extensions of service," C. J. Stubner, of Henry L. Doherty Co., Bartlesville, Okla., declared in a speech before the convention of the Southwestern Geographic Division of the National Electric Light Association, held at Hot Springs, Ark., recently. "Many people during the war, when wages were high and conditions prosperous, lost sight of the importance of saving and thrift did not enter their lives at all."

Public Support

The greater the public support the greater the service which a utility is enabled to render. A financially impoverished utility cannot serve the public satisfactorily. The public-utility business is not shrouded in mystery. Its principal problem is the problem of any commercial enterprise. Its product must be sold at a price which shows a margin over costs, and it must continuously expand its facilities to meet the growth of the community served.

THE WEEK'S NEWS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

N. E. L. A. DIVISION WILL DISCUSS POWER DEVELOPMENT.

Accounting and Public Relations Among Subjects to Be Discussed at Annual Convention of Northwest Geographic Division.

"Public Relations" and "Some Essentials of Power Development" are among the important subjects to be discussed at the 14th annual convention of the Northwest Geographic Division of the National Electric Light Association, to be held at Portland, Ore., June 15-17. The entertainment features of the program include an automobile, boat and inspection tour. The program for the business session follows:

June 15—Address of welcome by Mayor G. L. Baker of Portland; annual address of Franklin T. Griffith; addresses on "The National Electric Light Association" by M. H. Aylesworth, executive manager, and "Accounting" by George Nevins, and report of the executive committee, Accounting Section, by J. S. Simpson.

June 16—Report of the executive committee, Commercial Section, by R. W. Clark; report of the advisory committee, Northwest Electrical Service League; address by S. I. Miller, secretary-manager of the League; report of the executive committee, Public Relations Section, by W. H. McGrath; addresses on "Public Relations" by George L. Meyers and on "The Northwest—Its Present and Future in Industry" by Robert Sibley.

June 17—Address by L. T. Merwin on "Some Essentials of Power Development"; report of the executive committee, Technical Section, by George E. Quinan; executive session and election of officers.

ELECTRIC HEAT EXPERTS TELL OF THE PAST.

Meet to Discuss Heating Show to Be Held Next Week Under Auspices of New York Edison Co., But Grow Reminiscent Instead.

At a recent meeting of electrical men, called for the purpose of discussing plans for the coming electric heat show which The New York Edison Co. is going to hold during the week of June 6, some interesting facts were disclosed regarding the early history of electric-heating methods. When such well-known men as Roger Williams of the Simplex Electric Heating Co., A. E. Morford of the Domestic Laundry Equipment Co., and C. N. Lewis of The New York Edison Co. get together the chances are unusually good that some worth-while stories will be forthcoming.

For whatever honor there may be in having eaten the first electrically-cooked egg, Mr. Morford has made claim. He is the brother of T. E. Morford, who in 1890 secured patents on a process for producing electric heat by means of wires embedded in enamel. In the course of his experiments T. E. Morford made a small water cup with the wires embedded in the bottom. He and his father took the cup to the Chicago Board of Trade for the purpose of exhibiting it to some of the friends of Morford senior. Incidentally the Board of Trade building was one of the few structures in Chicago that boasted electric lights.

They connected the utensil with a lamp socket in the barber shop, filled it with water, and then called in several of the traders, among them Philip Armour. Mr. Armour was greatly interested and expressed amazement when the water began to boil. Accompanying his father and brother was A. E. Morford and when he saw the water boiling away so energetically he decided on a practical test and ran out and bought two eggs. These he proceeded to boil and he ate them with great relish, much to the entertainment of the barber-shop patrons.

Two years later the Electro-Enamelite Co. was organized to produce electric-heating equipment on a commercial scale and in 1893 the appliances were the center of interest at the Chicago World's Fair. One of the features of the Fair was the restaurant run by the Wellington Hotel Co. and each day the restaurant chef roasted a 75-lb. piece of beef in an electric oven. The roasting meat could be seen through the mica of the oven doors and it always drew a great throng of spectators. Nearby was an electric frying kettle in which doughnuts were cooked and report has it, according to Roger Williams, that more than one woman declined a sample doughnut because she was afraid of an electric shock.

The Morford experiments followed the work of C. E. Carpenter, who had developed an electric iron in which the resistance wires were separated by mica sheets. Mr. Carpenter had developed this at the suggestion of a Minneapolis tailor, Nevins by name, who had noticed how the rheostat of the electric motor heated up. The iron attained a very high temperature and to cool it the tailor plunged it in a pail of water. This, of course, resulted in a short circuit. Mr. Morford sought a heating element that could expand and contract with the heat and that should be moistureproof. Water boiling in an enameled kettle gave him an idea. He procured a quantity of enamel such as was used for oven doors and with it embedded wires in the bottom of a metal cup. Mr. Carpenter also experimented with this process and both Morford and Carpenter were granted patents by the U. S. Patent Office, one of the few cases on record where different men hold patents for the same process.

Of course all this had been preceded by extensive laboratory work all through the 80's, and even as far back as 1746 Franklin was experi-

menting with what he called electric fire. Following the Chicago Fair in 1893 there was great advancement made in the electric heating art. New companies came into the field, further applications for the process were found and today there is hardly a branch of industry which does not utilize some form of electric heat.

The Edison company electric heat show will continue from June 6 to 11 and will be free to the public.

HEARING ON CHICAGO ELECTRICAL TAX ORDINANCE.

Manufacturers of electrical devices, material and apparatus will do well to have representatives on hand before the Chicago city council at 2 p. m., Thursday, June 16, when there will be another hearing on the proposed ordinance to establish a yearly inspection and approval of electrical materials which, if put into effect, would either cost the electrical industry thousands of dollars or serve to bar their products from Chicago. At a hearing June 2, attended by a large number of delegates in attendance at the N. E. L. A. convention, the side of electrical interests was presented. The Commissioner of Gas and Electricity then asked for a continuance of 2 wks. in which to prepare his argument in support of the ordinance.

NORTH CENTRAL DIVISION, N. E. L. A., TO MEET.

Fuel Situation and Rural Electric Lines Among Subjects to Be Discussed at Annual Convention to Be Held This Month in Duluth, Minn.

"Rural Electric Lines" and "Coal Economy in Small Steam Plants" are among the important subjects to be discussed at the annual convention of the North Central Geographic Division of the National Electric Light Association, to be held at the Spaulding Hotel, Duluth, Minn., June 21-23.

The tentative program is as follows:

Tuesday, June 21, 1:30 *p. m.*—Trip to Jay Cook Park and the Great Northern power station.

Tuesday, June 21, 9 *p. m.*—Officers' reception and dance in the Spaulding Hotel ball room.

Wednesday, June 22, 9:30 *a. m.*—Address of welcome by Mayor Snively of Duluth; president's address; appointment of committees, and addresses by officers of the National Electric Light Association.

Wednesday, June 22, 1 *p. m.*—Entertainment for the ladies, consisting of luncheon at the Boat Club, bridge, boating and swimming.

Wednesday, June 22, 1:30 *p. m.*—Address on "General Business Conditions" by J. H. Ingwerson, First National Bank, Duluth; addresses on "The General Relations Between Telephone and Electric Companies in the Matter of Construction and Operation of Lines" by R. A. Gantt, chief engineer of the Northwestern Bell Telephone Co., Omaha, Neb., and a representative of the Tristate Telephone & Telegraph Co., St. Paul, Minn.

Wednesday, June 22, 6:30 *p. m.*—Boat ride on the lake and around the harbor, with luncheon on boat.

Thursday, June 23, 9:30 *a. m.*—Paper on "Rural Electric Lines" by F. R. Winders, Railroad Commission of Wisconsin, Madison, Wis., and an address on "The Fuel Situation" by W. T. Delihant, Jr., fuel agent of H. M. Byllesby & Co., Chicago.

Thursday, June 23, 1:30 *p. m.*—Reports of committees; election of officers, and a paper on "Coal Economy in Small Steam Plants" by J. J. Brennan, engineer of tests of the Northern States Power Co., Minneapolis, Minn.

Thursday, June 23, 2 *p. m.*—Entertainment for ladies, consisting of an automobile trip around the boulevards and tea at the Northland Country Club.

Thursday, June 23, 6:30 *p. m.*—Banquet and entertainment for delegates and ladies in the Spaulding Hotel ball room.

A. I. E. E. WILL DISCUSS TRANSMISSION PROBLEMS.

Program Arranged for Technical Sessions at Salt Lake City Convention Covers a Wide Range of Interesting and Important Subjects.

Voltage and power-factor control problems are among the important subjects to be discussed at the 37th annual convention of the American Institute of Electrical Engineers to be held jointly with the Pacific Coast convention at Salt Lake City, Utah, during the week of June 20. An outline of the tentative program was printed on pages 706 and 707 of the April 30 issue of ELECTRICAL REVIEW, since which time the following further details have been announced regarding the speakers and subjects to be presented at the technical sessions:

Tuesday, June 21, 10 *a. m.*—President's address by Arthur W. Berresford; technical committee reports; addresses on "Hydroelectric Developments at Niagara Falls" by J. L. Harper, and "Modern Developments in Waterwheels" by W. M. White.

Wednesday, June 22, 9:30 *a. m.*—Papers on "Economic and Engineering Problems of 220-Kv. Transmission" by L. E. Imlay; "Voltage and Power-Factor Control of 66,000-Volt Transmission Lines Connecting Two Generating Stations" by R. Bailey, and symposium on long-distance transmission systems, by F. G. Baum, W. W. Lewis and L. L. Elden.

Thursday, June 23, 9:30 *a. m.*—Papers on "Voltage and Current Harmonics Caused by Corona" by F. W. Peek, Jr.; "A Solution of the Porcelain Insulator Problem" by E. E. F. Creighton and F. L. Hunt; "Transformers for Interconnecting High-Voltage Systems or for Feeding Synchronous Condensers From a Tertiary Winding" by J. F. Peters and M. E. Skinner, and "Electric Strength of Air Under Continuous Potentials and as Influenced by Temperature" by J. B. Whitehead and F. W. Lee.

Friday, June 24, 9:30 *a. m.*—Papers on "Synchronous Motors for Ship Propulsion" by E. S. Henningsen; "Magnetic Properties of Compressed Powdered Iron" by Buckner Speed and G. W. Elmer, and "Heat Losses in Conductors of Alternating-Current Machines" by W. V. Lyon.

J. M. WAKEMAN HONORED BY MEMBERS OF S. E. D. STAFF.

On the evening of May 26 at the McAlpin Hotel, New York City, a dinner was given in honor of James M. Wakeman, the retiring general manager of The Society for Electrical Development, by present and former members of the staff. Formalities were barred; led by Harry Alexander, former director of publicity for the Society, those present gave "J. M." an idea of the esteem in which he is held.

A pleasant feature was acknowledgment by all that Mr. Wakeman had been a source of in-

spiration and those whose work had taken them into other fields paid a tribute to the value of the experience gained under his leadership. The general expressions of good-will showed that the guest of the evening carried away the heartfelt good wishes of all those who had served with him and it was felt that, while he may have severed his active connections with the Society, he will always remain a potent factor in its work; and that the ideals he had set, in the formative period of the society, constituted a solid foundation upon which the organization could rest and expand according to the plans he had helped to conceive, launch and push to fruition.

At the conclusion of the dinner Theodore Dwight, on behalf of the staff, presented a loving cup "To 'J. M.', An Appreciation from Associates in the S. E. D."

ELECTRIC VEHICLES DISPLAYED TO CONVENTION VISITORS.

The first electric automobile show ever held in Chicago was staged May 26 to June 4, inclusive, in connection with the National Electric Light Association Convention, the latter starting on May 31 and ending June 3. The automobile show, which included both electric pleasure cars and electric trucks, as well as a big display of electric accessories, was held in the ground floor display rooms of the Commonwealth Edison Co., 72 West Adams street.

Among the exhibitors were the Walker Vehicle Co., Ward Electric Truck Co., Commercial Truck Co., Oneida Truck Co., Ehrlich Truck Co., Milburn Electric Co., Magnetic Motor Corp., Electric Tractor Co., Mercury Tractor Co., W. F. Hebard & Co., R. and L. Baker Co., Elwell Parker Electric Co., Donahue & Co., Cutler-Hammer Manufacturing Co., C. P. Smith, Schaefer Brothers, Westinghouse Electric & Manufacturing Co., General Electric Co., Electric Storage Battery Co., Edison Storage Battery Co., K. W. Storage Battery Co., Philadelphia Storage Co., and Volcar Storage Battery Co.

PROPOSED SUPER-POWER SURVEY FOR PACIFIC NORTHWEST.

Committee Appointed and Purposes Outlined for a Complete and Detailed Study of Present and Future Energy Requirements.

The Oregon Technical Council recently selected a committee of 22 engineers as a super-power survey committee to consider and outline plans for a super-power line survey of the Pacific Northwest. In a preliminary statement relative to this matter the committee sets forth the objects sought in the proposed survey as follows:

(a) An authoritative and reliable compilation of data to be made available to the public, to capital, to existing and future operation companies, to industry in general, and to commercial and legislative bodies.

(b) To further industrial development by an attempt to forecast and to indicate such methods of power expansion, development and interconnection as will ultimately prove sound.

The super-power line survey for the Atlantic seaboard, it is pointed out, was undertaken primarily to study relief of transportation facilities, and for the conservation of coal. Neither of those two prime reasons for such a survey, it is alleged, exists in the Pacific Northwest.

The personnel of the committee, which embraces engineers from the northwestern states, is as follows: D. C. Henny, chairman, Portland, Ore.; J. C. Stevens, 1st vice-chairman, Portland, Ore.; C. E. Magnusson, 2nd vice-chairman, Seattle, Wash.; F. H. Murphy, secretary, Portland, Ore.; R. M. Boykin, Portland, Ore.; R. Beeuwkes, Seattle, Wash.; W. H. Crawford, Portland, Ore.; E. R. Cunningham, Portland, Ore.; R. H. Dearborn, Corvallis, Ore.; J. B. Fisken, Spokane, Wash.; J. P. Growden, Seattle, Wash.; F. F. Henshaw, Portland, Ore.; R. M. Jennings, Roseburg, Ore.; E. W. Lazell, Portland, Ore.; L. T. Merwin, Portland, Ore.; C. P. Osborne, Portland, Ore.; G. L. Parker, Tacoma, Wash.; W. M. Shepard, San Francisco, Cal.; G. E. Quinan, Seattle, Wash.; H. H. Schoolfield, Portland, Ore.; R. U. Steelquist, Albany, Ore.; and W. R. Putnam, Boise, Ida.

PERMIT GRANTED TO ILLINOIS FOR FOUR POWER PROJECTS.

The Federal Power Commission has granted a preliminary permit to the state of Illinois for power development at four sites on the proposed Illinois waterway. The permit will run to April 1, 1924. It is expressly stated in the preliminary permit that it shall not be construed as giving authority to divert water from Lake Michigan. Another condition set forth in the permit is that due consideration shall be given to prevention of currents detrimental to navigation and that the projected works shall be so designed that water levels may be maintained in accordance with rules and regulations for the protection of navigation.

The Federal Power Commission in taking action approved a memorandum prepared by its engineers. The conditions as stated in this memorandum will be written into the standard form of a preliminary permit and when that has been done the permit will be sent to the department of public works and buildings of the state of Illinois for acceptance. The power sites are located at Brandon road below Joliet on the Desplaines river; Dresden Island on the Illinois river; Marseilles and Starved Rock on the Illinois river.

A. U. A. ELECTS OFFICERS.

At the annual meeting of the Arkansas Utilities Association the following officers were elected for the ensuing year: President, R. M. Foster, Helena Water Co., Helena; first vice-president, S. R. Brough, Arkansas Water Co., Little Rock; second vice-president, S. A. Lane, Southwestern Bell Telephone Co., Little Rock; secretary-treasurer, R. I. Brown, Little Rock Railway & Electric Co.

RADIO ENGINEERS HOLD MEETING.

A paper on "Properties of Received Signals from the European Radio Stations" was presented by S. M. Kintner, vice-president of the International Radio Telegraph Co. at the June 1 meeting of the Institute of Radio Engineers held in New York City. The results of important recent experiments in trans-oceanic reception were given by the speaker.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Intercity Radio Co., New York City, has leased space in the Park Row building for local headquarters.

Lunkenheimer Co., Cincinnati, manufacturer of engineering specialties, has moved its Chicago branch to 568 West Washington boulevard.

Ross Heater & Manufacturing Co., Inc., Buffalo, N. Y., has announced the opening of a branch office at 2 Rector street, New York City, in charge of C. M. Hardin.

George H. Gibson Co., Tribune building, New York City, consulting engineer, specializing in commercial research and advertising, has moved to 100 Gold street.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has issued a 2-color folder 4455 entitled, "Fans for Efficiency," which is descriptive of the Ventura fans.

Stephens-Adamson Manufacturing Co., Aurora, Ill., manufacturer of transmission, elevating, conveying and screening machinery, plans to erect a branch plant at Los Angeles, Cal.

Westinghouse Air Spring Co., 109 West 64th street, New Haven, Conn., has purchased the plant of the Trego Motors Corp. at a public sale for a consideration of $72,250, and will use the property for a new works.

International Cultivator Corp., New York City, has purchased the property of the defunct Termaat-Monahan Manufacturing Co., Oshkosh, Wis., manufacturer of electrogenerating systems, etc., and plans to resume operation of the plant.

Bleadon-Dun Co., 213 South Peoria street, Chicago, manufacturer of electromedical apparatus, has announced that A. E. Brandon, for several years engaged in sales-promotion work for the Johns-Manville Co., has joined the Bleadon-Dun organization as sales manager.

Crawford Manufacturing Co., 13-21 Park Row, New York City, and Concord, N. H., has prepared a 2-color folder on its 2- and 3-phase Crawford induction motors. The details of their constructional features are fully presented and illustrated and their performance characteristics discussed.

Griscom-Russell Co., 90 West street, New York City, manufacturer of heaters, evaporators, multiwhirl coolers, separators, strainers and other specialties, has issued bulletin No. 330 covering "Reilly" evaporators for marine service. The company states that this type of evaporator is being successfully used in stationary power plants and central stations for providing pure water for boiler-feed makeup.

Surf Manufacturing Co., Milwaukee, manufacturer of the "Surf" electric clothes washer, has been taken over by the Sunbeam Domestic Appliance Co., of Evansville, Ind., according to a recent announcement. The new owner plans to move the entire plant to a new "daylight" factory in Evansville, and expects to be permanently located there about June 10 or 15. This will include the moving of the main office from Milwaukee also. Sunbeam Domestic Appliance Co. will retain the trade name of "Surf," which, it is

Evansville (Ind.) Factory of Sunbeam Domestic Appliance Co.

stated, so aptly describes the action of the water in the washer. The company will be under the active management of O. F. Fischedick, formerly of the Surf Manufacturing Co., backed by some of Evansville's most prominent people. The change will enable the new company to manufacture its product under more favorable conditions both as to additional capital and lower labor costs, as well as being centrally located and provided with excellent shipping facilities.

Electric Service Supplies Co., 17th and Cambria streets, Philadelphia, has announced that it will act as exclusive selling agent for the Peerless Equipment Co. of Hanover, Pa., manufacturer of Peerless armature repair machinery and Segur coil-winding tools. Heretofore Peerless armature tools were manufactured by the Manley Manufacturing Co., York, Pa., and Segur coil-winding tools were made by the Electrical Manufacturers Equipment Co., Chicago.

General Electric Co., Schenectady, N. Y., has issued a loose-leaf bulletin bearing the title "Weatherproof High-Tension Outdoor Substations," which describes and lists outdoor substation equipment developed for use in the open air under any and all conditions that may be found where transmission lines are in operation. The bulletin includes the statement that the successful operation of this apparatus is independent of climatic conditions, lack of skilled attendance or infrequent operation, or a combination of these. The low-tension equipment described was not designed primarily for outdoor use. It is the same apparatus used regularly in indoor stations and thus, when furnished as a part of an outdoor installation, is located in switch houses specially designed for mounting on the ground or on a pole or tower structure as the needs of a particular installation require. A study of the bulletin should be of assistance to the man who is interested in the purchase or operation of outdoor substation equipment.

Trumbull-Vanderpoel Electric Manufacturing Co., Inc., Bantam, Conn., manufacturer of knife switches, inclosed safety switches, switchboards, panelboards, steel and wood cabinets, battery switches, etc., has issued catalog No. 2 illustrating and describing its line of equipment.

Rome Wire Co. has announced that in order to keep step with the expansion of manufacturing facilities at its plants in Rome and Buffalo, N. Y., the company has opened district sales offices at 50 Church street, New York City, in charge of H. S. Hammond, who has represented the company in the eastern territory during the last 20 yrs.

Peerless Light Co., 663 West Washington boulevard, Chicago, is about to establish quarters on the Pacific Coast, having purchased a location on Market street, San Francisco, and opened temporary salesrooms at 149 Second street pending the construction of its new building. J. H. Reiss has been promoted to Western manager and is now located in San Francisco.

Reinforced Switch & Manufacturing Co., 516 Federal street, North Side, Pittsburgh, has been organized as the successor to the Eclair Machine Tool Co., Ambridge, Pa., where the new company will maintain its works, and manufacture an electric switch and fuse clips. The officers of the company are: President, W. J. Keist; vice-president, H. H. Schaefer; treasurer, Charles Dunbar, and secretary, W. J. Schaefer.

Uehling Instrument Co., 2000 Empire building, New York City, manufacturer of fuel-saving equipment, has announced that its Chicago office has been moved to the Great Northern building, 20 West Jackson boulevard. Walter C. Lange, who has been appointed manager of this office, is well qualified to co-operate with power-plant operators in solving problems of fuel conservation because of his former experience in this field with the Consolidated Gas Co. of New York City and the Hammel Oil Burning Equipment Co. and until recently in the New York office of the Uehling Instrument Co. Mr. Lange is a member of the American Society of Mechanical Engineers and a graduate in mechanical engineering of the Stevens Institute of Technology. Uehling Co. recording equipment and other boiler-room instruments will be on display in the Chicago office.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

JULIEN NARDI, of the University of Illinois, Urbana, Ill., has been appointed national secretary of the Student Chapters of the American Association of Engineers.

GARDNER C. DERRY has been placed in charge of the fuel economizer and mechanical draft department of B. F. Sturtevant Co., Hyde Park, Boston. He was formerly district manager of the power apparatus department, New York office.

W. M. BARTLETT has been appointed vice-president and general manager of the Splitdorf Electrical Co., Newark, N. J., rejoining the company after an absence of a little more than a year. He became connected with the company in 1911 and remained with it until 1919, acting as secretary during the last 6 yrs. of that period.

F. B. JEWETT, chief engineer of the Western Electric Co., who is one of the best known telephone engineers in the United States, has been elected a vice-president and director of his company. He will continue his present duties in charge of the technical forces of the great telephone manufacturing industry. Dr. Jewett, who was a lieutenant-colonel in the Signal Corps during the war, and who was decorated with the Distinguished Service Medal, was born in Pasadena, Cal., Sept. 5, 1879. He graduated from the Throop Polytechnic Institute of Pasadena in 1898 with the degree of A. B. in electrical engineering. From 1898 until June, 1902, he was a

F. B. Jewett.

graduate student in the University of Chicago, receiving the degree of Ph. D. in 1902. The last 2 yrs. of his post-graduate work he was research assistant to Prof. Michelson of the Department of Physics. From 1902 to 1904, Dr. Jewett was instructor in physics and electrical engineering at the Massachusetts Institute of Technology. His connection with the commercial telephone world dates from September, 1904, when he became transmission engineer for the American Telephone & Telegraph Co. While acting in this capacity, the loading of 8-gauge circuits was perfected; phantom cables and phantom loading for open wires and cables were developed; the New York to Denver circuit and line was engineered and also the Boston to Washington underground cable. In April, 1912, Dr. Jewett became assistant chief engineer of the Western Electric Co., in charge of all development and research work. He has been chief engineer since 1916. Dr. Jewett was an advisory member of the Special Submarine Board of the Navy and contributed much toward the perfection of devices for detecting hostile submarines. The perfection of wireless telephony is one of the most startling undertakings completed under his direction. He is a member of the Machinery, Engineers and University Clubs of New York; University Club of Chicago; Cosmos Club of Washington; is a former vice-president and fellow of the American Institute of Electrical Engineers; a member of the Council of the American Physical Society; a director of the Telephone Society; a member of the National Academy of Sciences; a trustee of the Engineering Foundation; a member of various committees of the National Research Council, and many other clubs and institutions. He is the author of many brochures, and published addresses on physical and electrical subjects.

J. T. MARRON, president of the Electrical Construction & Machinery Co., former president of the Marron Manufacturing Co., and for 22 yrs. a manufacturer of Rock Island, Ill., has given up his business associations in that city and has gone to Preston, Ia., where he has purchased the Rural Power Co.'s plant from J. J. Maher, of Preston. A high-tension line will be run from Clinton which will serve Preston, Goose Lake, Miles, Sherlock, Bryan and Sprague ville, serving these towns and the rural districts with light and power. Mr. Marron expects to expand the business. F. M. Burt, secretary of the Electrical Construction & Machinery Co., will be associated with Mr. Marron in the new enterprise. J. J. Murphy, also of Rock Island, will go to Preston as chief engineer of the lighting plant. The stock and machinery of the Electrical Construction & Machinery Co. of Rock Island has been removed to Preston and will be used in the upbuilding of the light and power business there.

HERMANN SPOEHRER, who was recently elected president of the Missouri Association of Public Utilities, is secretary of the Union Electric Light & Power Co., St. Louis. He became affiliated with that company in September, 1904, as assistant to the general manager, later succeeding the purchasing agent, which position he held a short time when he was appointed superintendent of construction to supervise the building of the Union company's Ashley street river wall, intakes and settling basins. He continued this supervision until the

H. Spoehrer.

spring of 1906, when he was appointed auditor of the company and later secretary, which position he holds at the present time. Mr. Spoehrer graduated from the electrical engineering department of Cornell College in 1899, and prior to locating in St. Louis in 1904 he was connected with the New York Electrical Equipment Co. of New York City, during which time he was engaged in wiring some of the largest office buildings and hotels in that city, as well as installing isolated plants in some of them.

OBITUARY

ADOLPH SORGE, JR., who was well known in engineering circles in Chicago, died May 5. He was formerly general western representative of the Harrison Safety Boiler Works, of Philadelphia, subsequently incorporated as the H. S. B. W.—Cochrane Corp., and established branch offices in St. Louis, Detroit, Indianapolis, Cincinnati, Minneapolis and Omaha. He was among the first to see the advantages of heat in the chemical treatment of water for the removal of hardness, and the present Sorge-Cochrane hot process water softener is a further development of ideas originally patented by him. He was often consulted on steam-plant problems and his skill in rectifying defective steam-plant piping was widely known throughout the West. Mr. Sorge was one of the originators and founders of the Technical Club of Chicago, and was also a member of the Engineers Clubs of Chicago and New York, as well as of the American Society of Mechanical Engineers.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Rutland, Vt.—The Vermont Hydro-Electric Corp. is negotiating with the Newport (N. H.) Electric Co., to furnish it with power for distribution at Newport and vicinity. A transmission line, 10 mi. long, will be constructed to supply the service. The company has perfected plans for the installation of a new 1250 k.v.a. generator and turbine at its Mendon station. Plans for the installation of similar equipment at the Glenn station have been abandoned, the Mendon work serving the increased power necessary.

Great Barrington, Mass.—The South Berkshire Power & Electric Co. has acquired the Rockdale mills and adjoining property at Rockdale, Mass., from the Ramsdell Brothers' Co. The company will use the acquisition for extensions in its electrical system.

Indian Orchard, Mass.—Electrical equipment will be installed in the foundry to be erected by the Chapman Valve Co., on Pine street, contract for which has been awarded to E. J. Pinney, Inc., 374 Main street, Springfield, Mass. It will be 1-story, 94 by 280 ft., and is estimated to cost $125,000.

West Newton, Mass.—The Security Mills, Inc., will build a power house, 30 by 35 ft., in connection with the erection of a knitting mill and dye house at Newtonville, Mass., estimated to cost $125,000. Motors and electrical equipment will be installed in other parts of the plant.

Binghamton, N. Y.—The Binghamton Light, Heat & Power Co., has completed the installation of a new substation for furnishing service at Union and vicinity. The company is considering the extension of its lines for light and power service at Whitney Point and Maine, N. Y.

Brasher Falls, N. Y.—The Milling & Lighting Co., Inc., has made application to the Public Service Commission for permission to construct a transmission line from its power plant to Nicholville, Lawrence county.

Brooklyn, N. Y.—The Brooklyn Edison Co., 360 Pearl street, has awarded a contract to the George F. Driscoll Co., 548 Union street, for the erection of a 2-story addition to its substation on Sumpter street, 30 by 100 ft., to cost about $60,000.

Buffalo, N. Y.—The City Council is considering the installation of an improved street-lighting system on Genesee street, from Jefferson to Bailey avenues.

Central Islip, N. Y.—The State Hospital Commission, Albany, E. S. Elwood, secretary, will take bids at once for the construction of an addition to the power plant at the Central Islip Hospital.

Dundee, N. Y.—E. H. Bailey has made application to the Public Service Commission for permission to construct an electric transmission line to Milo, Yates county, for furnishing local light and power service.

New York, N. Y.—An overhead electric system, with feed wires, etc., will be installed on Staten Island by the Department of Plants and Structures, Commissioner Grover A. Whalen, for the operation of a municipal trackless trolley system. An appropriation of $56,000 has been granted by the Board of Estimate for certain features of the work. The line will total about 6.5 mi. in length.

New York, N. Y.—The New York Edison Co., 130 East 15th street, has awarded a contract to F. M. Maddon, 1369 Broadway, for the erection of an addition to its 3-story power plant, 29 by 56 ft., at 120-22 Cedar street, to cost about $120,000 with machinery.

New York, N. Y.—Considerable electrical equipment, including motors, fans, lighting apparatus, etc., will be installed in the public schools to be erected by the Board of Education. The Board of Estimate has appropriated $15,000,000 for the work.

New York, N. Y.—The American Power & Light Co., 71 Broadway, has disposed of a bond issue of $3,500,000, to be used for financing and general operations.

Niagara Falls, N. Y.—The Niagara Falls Power Co., has arranged for a bond issue of $6,000,000, the proceeds to be used in part for the erection of its hydroelectric generating plant. The enlargement and extension program will increase the present combined capacity from 486,000 to 673,500. Foundation work for the new station is under way.

Dover, N. J.—The New Jersey Power & Light Co. is arranging for an extension of the street-lighting system at Mt. Arlington Borough to Jefferson Township, in the Lake Hopatcong section.

East Orange, N. J.—Electrical equipment, including motors, ventilating apparatus, etc., will be installed in the school buildings to be erected by the Board of Education at an estimated cost of $500,000.

East Orange, N. J.—The City Council is negotiating with the Public Service Electric Co., for the installation of an underground conduit system on Main street, in connection with the widening of the thoroughfare.

Hightstown, N. J.—Construction work has been inaugurated on a new electrically operated pumping plant for the waterworks system to cost about $45,000.

Jersey City, N. J.—Considerable electrical equipment will be installed in the new branch plant to be located at Jeffersonville, Ind., by Colgate & Co., 105 Hudson street, manufacturer of soaps, toilet specialties, etc. The company has acquired state property, used as a reformatory here, and will remodel the structures to accommodate the new industry.

Madison, N. J.—The Common Council is planning improvements in the municipal electric power plant, and has authorized an investigation for ascertaining the present condition of the plant and estimated cost of proposed betterment.

Newark, N. J.—A power plant and complete electrical equipment will be installed in the proposed municipal market building to be erected by the City Commission on property in the vicinity of Mulberry street, to be acquired for a consideration of about $750,000. The new building will cost in excess of this amount, and will be 150 by 604 ft. An electric signal system reaching to all parts of the building will also be installed. Frank Grad, 245 Springfield avenue, is architect.

Toms River, N. J.—The United States District Court has appointed Edmund S. Fritz and Winfield Crawford receivers for the Ocean County Electric Co., operating in this district. The company has a new hydroelectric power plant under construction on Toms river. Headquarters are in the Widener building, Philadelphia.

Wilmington, Del.—The Executive Commitee of the Board of Park Commissioners is considering the installation of special lighting equipment at Stapler Park, during the week of the Chautauqua, June 2-9.

Allentown, Pa.—The City Council is considering the extension of the present flood light system on Hamilton street to the Lehigh river bridge.

Annville, Pa.—The Common Council has entered into a contract for lighting with the Annville Electric Co. The agreement has been submitted to the Public Service Commission for approval.

Beaver Falls, Pa.—Electrical equipment will be installed in the 1-story plant addition to be erected by the Traver Engineering Co., to be 100 by 200 ft. It will be used for the manufacture of special machinery and is estimated to cost $50,000.

Brockwayville, Pa.—The Brockway Light, Heat & Power Co. has been incorporated with a capital of $50,000 to operate a local light and power system. M. E. Keys is treasurer.

Harrisburg, Pa.—The Public Service Commission is arranging a number of hearings for complaints against the service rendered by the Harrisburg Light & Power Co., with view to having the company make necessary extensions and improvements in its system.

Hazleton, Pa.—The Lehigh & Wilkes-Barre Coal Co., Wilkes-Barre,

Pa., will increase the capacity of the power house at its Green Mountain colliery in the vicinity of Hazleton.

Philadelphia, Pa.—The Philadelphia Electric Co. has acquired property on Tacony street, near Robbins street, 75 by 373 ft., for a consideration of $16,500, heretofore held by the Holesburg, Frankford and Tacony railway. It will be used in connection with local operations.

Steelton, Pa.—The City Council has arranged for the installation of new electrical pumping machinery at the pumping plant used for the municipal waterworks.

Annapolis, Md.—The Harpers Ferry Light & Power Co. has made application to the Public Service Commission to make extensions in its lines.

Baltimore, Md.—Electrical equipment will be installed in the mechanical laundry plant to be constructed by the United Laundry Co., at 320-30 West Biddle street, to be 30 by 144 ft.

Baltimore, Md.—The Board of Education has arranged an appropriation of $250,000 for the installation of new heating and ventilating systems, with electrically operated equipment, in 17 public school buildings. Power houses will also be constructed, with equipment in fireproof partitions. Four engineers have been selected to prepare plans.

Baltimore, Md.—Considerable electrical equipment will be installed in the proposed additions to be made at the plant of the Bethlehem Steel Co., and its subsidiary organization, the Bethlehem Shipbuilding Co., in the Sparrows Point section. An expansion program covering an expenditure of $25,000,000 during the coming months is being arranged.

Baltimore, Md.—Electrical equipment will be installed in the 1-story addition to be erected at the plant of the United States Industrial Alcohol Co., Curtis Bay.

Baltimore, Md.—The Chesapeake & Potomac Telephone Co. has arranged a program of extensions and improvements in this district to cost about $560,000. The work will include new switchboard and other equipment at the Madison exchange to cost about $74,000; similar work at the Hamilton exchange to cost $64,600; and completion of the new automatic Liberty exchange. Underground lines will be installed at a cost of over $50,000, and new aerial cable installed in the Curtis Bay section. The rural lines will also be improved and extended.

Cumberland, Md.—The City Council has passed an ordinance requiring the installation of underground conduit lines on Mechanic street by the Edison Electric Illuminating Co., Pennsylvania Railroad Co., Postal Telegraph Co., Western Union Telegraph Co., and the Chesapeake & Potomac Telephone Co. The work is to be done at once, prior to the paving of the thoroughfare. A new "white way" lighting system will also be installed on the street.

Frostburg, Md.—The Big Savage Fire Brick Co. is planning the rebuilding of its power house, recently destroyed by fire with a loss estimated at $20,000.

Oxford, Md.—The Common Council is arranging a bond issue of $15,000 for extensions and improvements in the local electric system. Fletcher Hanks, commissioner, is in charge.

Riverdale, Md.—The Borough Council is planning the establishment of a municipal power plant for service to Berwyn, Bowie and vicinity. S. M. McMillan is mayor.

Washington, D. C.—The Potomac Electric Power Co. has awarded a number of contracts for extensions in its power plant at Benning, near Washington, as follows: Edge Moor Iron Co., Edge Moor, Del., two 1000-hp. boilers; American Engineering Co., Washington, underfeed stockers and auxiliary equipment; and B. F. Shaw Co., Wilmington, Del., for steam power plant piping.

Fairmont, W. Va.—Directors of the Monongahela Valley Traction Co. have voted to change the name of the company to the Monongahela Power & Railway Co.

Huntington, W. Va.—The Consolidated Light, Heat & Power Co. is arranging for an increase in its capital from $530,000 to $865,000. W. W. Perkins is secretary.

Logan, W. Va.—Electrical equipment and refrigerating apparatus will be installed in the cold storage plant to be erected by Haislip & Co., recently incorporated with a capital of $200,000. Meanor & Hadloser, Huntington, W. Va., are architects.

Morgantown, W. Va.—The North American Coal Co. is planning the rebuilding of its power plant, recently destroyed by fire.

Chimney Rock, N. C.—J. M. Flack has arranged for the installation of a new electric lighting plant for service at the Mountain View Inn and vicinity.

Winston-Salem, N. C.—The City Council has awarded a contract to the Southern Public Utilities Co. for the installation of a new street-lighting and commercial system.

Charleston, S. C.—The Bureau of Yards and Docks, Navy Department, Washington, D. C., has awarded a contract to the Carroll Electric Co., Washington, for extensions and improvements in the power plant at the naval station at Charleston, to cost about $85,000.

Georgetown, S. C.—The Common Council is planning extensions and improvements in the local electric-lighting plant and system. J. J. McKeithen is city clerk.

Albany, Ga.—Electrical equipment will be installed in the plant to be erected by the Virginia-Carolina Chemical Co., to replace its fertilizer works recently destroyed by fire.

Plant City, Fla.—The city is considering issuing $150,000 bonds for establishing electric lighting and ice plants. Address the mayor.

Quincy, Fla.—The city voted $175,000 bonds to establish a municipal hydroelectric lighting and power plant. Address the mayor.

NORTH CENTRAL STATES.

Lima, O.—The contract for the new boulevard lighting system in the downtown district and the West Market street extension was awarded to the Northern Electric Co., Columbus. The firm secured the contract on its bid of $132,014.35.

Detroit, Mich.—In order that the Public Lighting Commission may be able to provide power for the municipal railway lines, Frank R. Mistersky, superintendent for the Commission, asked the council to approve the entering into a contract with engineers for plans for a new power plant which he estimated would cost $5,000,000 and that the new plant would provide 75,000 hp. and would be capable of providing power for the M. O. lines, and of supplying sufficient current to light the city's streets for many years.

Detroit, Mich.—The Harper Hospital Association is taking bids for the erection of a 2-story and basement addition, including power plant, to cost about $85,000. Dr. Stewart Hamilton is superintendent. Albert Kahn, 1000 Marquette building, is architect.

Grand Rapids, Mich.—Citizens of Plainfield avenue are planning to petition the City Commission for boulevard lights along a section of the street extending from Grove to Knapp street, a distance of nine blocks, which will cost $15,000.

Greentown, Ind.—May 27 bids were received for an electric power lighting system for the school. Address Elmer E. Dunlap, engineer, County State Life building, Indianapolis, Ind., and Harrison building, Kokomo, Ind., or F. W. Sherman, Union township clerk.

Rock Island, Ill.—The People's Power Co. is installing distribution lines for the electric lighting of Campbell's Island, a summer cottage resort near this city.

Shirley, Ill.—The Shirley Light & Power Co. has been incorporated with a capital of $25,000. The incorporators are Charles W. Hutchinson, Charles Zeig, Delos Funk, J. P. Walters and C. Welch. Power and light will be furnished the village of Shirley and adjacent territory.

Springfield, Ill.—Contractors have begun work on the installation of the new downtown lighting system. Freeman Sweet & Co. have the contract.

Cashton, Wis.—The cities of Cashton, Viroqua and Westby contemplate erecting transmission lines to cost $90,000. Address Wisconsin-Minnesota Light & Power Co., Eau Claire, Wis.

Elroy, Wis.—Electric power line will be extended from Elroy to Kendall, New Lisbon and Camp Douglas, also branch lines to farmers. Address Arthur P. Gale, secretary and manager, Baraboo Valley Utilities Co., Wonewoc.

Mayville (Kekoskee), Wis.—A stock company has been formed to furnish that village with electric light and power. The line will be built from the Steel & Tube Co.'s plant at Mayville.

Duluth, Minn.—Architect F. F. Fitzgerald, Alworth building, is preparing plans for $11,000, 1-story transformer station. Address Duluth Edison Co., 210 W. First street.

Jackson, Minn.—Bonds to the amount of $13,500 will be voted for installing ornamental lighting system. Address Bert Knudson, city clerk.

Redwood Falls, Minn.—An election

will be held to vote on the question of issuing $8000 electric light bonds.

Cedar Rapids, Ia.—Improvements will be made to the lighting system, including the substitution of the present 60-cp. lamps for 100-cp. lamps. Address Iowa Railway & Light Co., Dows building, Cedar Rapids.

Clarinda, Ia.—A municipal electric plant will be erected. The Clarinda Community Club is interested. Address Dr. C. B. Eller.

Des Moines, Ia.—The lighting system will be extended from Fifth and Chestnut to 13th and Crocker streets. Address Keosauqua Way Improvement League, E. E. Dudley, chairman, or A. E. McGlothen, city clerk.

West Liberty, Ia.—The North Prairie Electric Light & Power Line Co. has been incorporated with a capital of $2,500. Address F. L. Owen, president.

Clarksville, Mo.—The Clarksville Light & Water Co., recently organized, is planning the construction of a power transmission line to Louisiana, Mo., to furnish service in this section.

Fulton, Mo.—The City Council has authorized the purchase of a new generating unit for the municipal plant, to consist of an engine and generator, the cost of which will be approximately $25,000.

New Haven, Mo.—The Common Council has taken bids for the construction of an electric power plant for municipal service. Fuller & Beard, Chemical building, St. Louis, are engineers.

Sedalia, Mo.—An outline of plans for enlarging the boulevard lighting system has been prepared and approved by the Sedalia Chamber of Commerce. It will provide for 178 standards. The system will cost about $37,500.

Hebron, Neb.—A hydroelectric plant will be erected on Blue river near here, the estimated cost being $25,000. Address W. Kassenbaurn.

Pawnee City, Neb.—E. T. Archer & Co.. 609 New England building, Kansas City, Mo., consulting engineers, have prepared plans for the erection of an $85,000 power plant. Address H. Florey, city clerk.

Beresford, S. D.—The city will install a municipal light plant and waterworks system, bonds to the amount of $70,000 having been voted for this purpose. Address city clerk.

Brookings, S. D.—Bonds to the amount of $60,000 were voted for remodeling and building an addition to the municipal light and power plant. Address G. H. Stoddart, city clerk.

Watertown, S. D.—Bids were received May 23 for additional power-plant equipment. Address Brownie Mather, city auditor.

Hope, N. D.—Bonds have been voted for electric light plant improvements. Address the mayor.

SOUTH CENTRAL STATES.

Ashland, Ky.—The Elkhorn Star Coal Co. is planning the installation of new electrically operated coal-mining machinery at its properties at Minnie, Ky. W. D. Sutton is president and manager.

Birmingham, Ala.—The Corona Coal Co. has arranged an appropriation of about $400,000 for the electrification of its mining properties at Townley. A power plant will be constructed, and present equipment both inside and outside at No. 1 and No. 2 mines replaced with electrically operated machinery.

New Orleans, La.—The Consumers' Electric Light & Power Co. has preliminary plans under way for the construction of a power plant. W. J. Aicklen is president.

Dierks, Ark.—The Dierks Lumber & Coal Co. is planning the construction of a power transmission line to DeQueen, Ark.

Comanche, Okla.—The city voted May 24 on a proposed bond issue of $275,000 to be used for construction of waterworks, a sanitary sewer system and for a system of electric lights.

Georgetown, Tex.—The City Council is planning the erection of additions to the municipal electric power plant to double the present capacity.

WESTERN STATES.

Livingston, Mont.—The city will consider installing an ornamental lighting system. Address Montana Power Co.

Olympia, Wash.—Olympia's plan for lighting the main business district of the city with cluster lights was exhibited at the meeting of the Chamber of Commerce lighting committee by Adolph Schmidt. The cost was shown not to exceed $50,000 according to a statement made by Superintendent Ransome of the Olympia Light & Power Co. The estimate of the superintendent includes the construction of 310 lamps, like the one now standing at the corner of 6th and Main streets. Address Secretary H. B. Fultz, of the Chamber of Commerce.

Pasadena, Cal.—Bids were received May 26 for an automatic motor-operated induction voltage regulator for supplying feeder circuits, 2200 volts as may be required, 3-phase, 50-cycle. Address Bessie Chamberlain, city clerk.

PROPOSALS.

Redfield, S. D.—Bids will be received June 9 for improvements to waterworks, the specifications for which include one steam turbine and three electric motors for direct connection to centrifugal pumps. Address C. J. Mariner, city auditor.

Washington, D. C.—Sealed proposals will be opened June 6 for the installation complete of an electric dumb waiter in the U. S. Post Office at Chillicothe, O., in accordance with the drawings and specifications, copies of which may be had at the office of James A. Wetmore, acting supervising architect, Washington, D. C.

Washington, D. C.—Sealed proposals will be opened June 8 for materials and labor for the construction of the U. S. Post Office at Pratt, Kan. Proposals will be received separately for work installed complete as follows: (m) electric conduit and wiring; in accordance with drawings, specifications, and bills of quantities, which may be obtained from the custodian of the site at Pratt, Kan., or at the office of James A. Wetmore, acting supervising architect, Washington, D. C.

INCORPORATIONS.

New York, N. Y.—Multiple Storage Battery Co. Capital, $1,000,000. To manufacture storage batteries and other electrical equipment. Incorporators: George V. Reilly, Austin H. Smith, and Arthur W. Britton, 34 Cedar street.

Camden, N. J.—E-E Electric Service Corp. Capital, $10,000. To deal in electric equipment and operate as a contractor. Incorporators: William R. and Louis R. Abramson.

Newark, N. J.—Service Electric Co., 328 South 7th street, has filed notice of organization to manufacture and deal in electrical specialties. M. Kern heads the company.

Jersey City, N. J.—Gainaday Electric Co. Capital, $200,000. To manufacture electrically operated washing machines. Incorporators: H. A. Black, John R. Turner and Alfred F. McCabe, 15 Exchange place.

Newark, N. J.—Apex Electric Co., 1379 Springfield avenue, has filed notice of organization to manufacture electrical apparatus. M. Freund, 946 South Grove street, Irvington, heads the company.

Framingham, Mass.—Knowlton Electric Co. Capital, $5000. To manufacture electrical specialties. Fred W. Spaulding, president and treasurer; and Frederick H. Knowlton, Framingham, secretary.

Albany, N. Y.—Taylor-Malcolm Co. Capital, $15,000. To manufacture and deal in storage batteries. Incorporators: S. and G. B. Taylor and I. Malcolm, Albany.

New York, N. Y.—Chatham Electric Engineering Co. Capital, $20,000. To engage as electrical engineers. Incorporators: E. M. Irwin, P. H. Delehanty and V. F. Brown, New York.

New York, N. Y.—Violet Ray Corp. Capital, $1,000,000. To manufacture electrical specialties, violet ray apparatus, etc. Incorporators: M. E. Nolan, S. C. Berry and E. C. Ballantyne.

FOREIGN TRADE.

[Addresses of firms referred to in these trade opportunities may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its branch and local co-operative offices. Request for each opportunity should be on a separate sheet and the file number given.]

Light and Power Plants (34,799)—An American firm, with representatives and offices in China, Manchuria and Siberia, desires exclusive agencies for lighting plants, power plants, etc. References.

Fire-Alarm Systems (34,803)—An inquiry has been received from a business man in Chile for catalogs and full descriptions of fire and police-alarm systems suitable for a city of 500,000 inhabitants. Reference.

Phonograph Motors (34,805)—A firm of merchants in Canada desires to purchase phonograph motors. Quotations should be given f. o. b. port of shipment. Payment to be in cash. Reference.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

New Issue of Consolidated Water Power & Paper Co. Bonds.

Lee, Higginson & Co., the First Trust and Savings Bank of Chicago, First Wisconsin Co., Milwaukee, and Marshall Field, Glore, Ward Co., Chicago, are offering a new issue of $3,000,000 Consolidated Water Power & Paper Co. 10-yr. first mortgage 7.5% sinking fund gold bonds at 97.5 and interest, yielding about 7.85%. The Consolidated Water Power & Paper Co. supplies the city of Wisconsin Rapids with light and power and sells power to the local public utility at Stevens Point, Wis.

San Diego Company Issues $2,750,000 Bonds for Improvements.

Following approval of the Railroad Commission of California, the San Diego Consolidated Gas & Electric Co. issued and sold to H. M. Byllesby & Co., Harris Trust and Savings Bank, and Blyth, Witter & Co., an issue of $2,750,000 first and refunding mortgage 6% gold bonds, due March 1, 1939. Proceeds of the issue will provide needed improvements and extensions to the company's present gas and electric generating equipment, transmission and service facilities. The company's business has had a phenomenal growth—increasing from 1,205 electric customers in 1905 to 27,763 in 1920. The gas business has increased almost as much—from 2,090 customers in 1905 to 27,188 in 1920.

A part of the improvement program provides for the purchase of the powerhouse of the San Diego Street Railway Co. with 8,200-kw. of installed capacity and for the enlargement and improvement of this station. Earnings of the company for the year ended April 30, 1921, compared with previous years are reported as follows:

	1912	1916	1921
Gross	$836,455	$1,501,248	$3,092,524
Net	434.044	721,707	913,346

The bonds, which were first offered May 16, were quickly absorbed at a price of 87, to yield 7.30%.

Oregon Utility's Bonds Purchased by National City Co.

A new issue of $4,500,000 first-lien refunding bonds of the Portland (Ore.) Railway Light & Power Co. has been purchased by the National City Co., of New York. The bonds, which run 25 yrs. at 7.5%, are for refinancing the Portland company's outstanding indebtedness, which includes short-time paper. The issue is in denominations of $500 and $1,000, dated May 1, 1921, and are quoted at 96 and accrued interest, thus yielding 7.85%. This financing provides for reimbursing the local company for the acquisition of property heretofore temporarily financed, and will place the company's treasury in satisfactory condition.

The issue, in addition to being a direct mortgage, will share, through the pledge, with $6,700,000 of first and refunding 5% bonds, as a direct lien on over 75% of the company's generating capacity, including 58,000 hp. in hydroelectric plants and 31,000 hp. in modern steam plants.

As a plan of redeeming the refunding bonds the new mortgage provides for a sinking fund requiring the cash payment of $225,000 semi-annually. During the life of the refunding bonds this will result in retiring $10,000,000. The company's net earnings for 12 months ending April 30, 1921, amounted to more than twice the annual charges on mortgage bonds of the company.

Portland Railway, Light & Power Co.

	1921	1920
March gross	$ 862,425	$ 747,154
Net earnings	268,575	203,492
Balance after charges	95,019	27,631
12 mo. gross	9,915,984	8,684,531
Net earnings	3,022,292	2,826,559
Balance after charges	932,498	700,372

Canadian Bell Telephone Co. Will Issue New Stock.

The Bell Telephone Co. of Canada announced May 16th issuance of $5,725,000 in new stock to be offered to shareholders at par in the proportion of one new share for each four shares of record May 31.

Scuthern Utilities Co.

	1921.	1920.
February gross	$ 266,830	$ 203,701
Net after taxes	69,011	52,158
Total income	70,650	52,392
Surplus after charges.	52,974	36,426
Balance after dividends	52,150	36,426
12 mo. gross	2,713,231	2,061,504
Net after taxes	475,177	344,940
Total income	479,455	346,540
Surplus after charges.	260,904	150,088
Balance after dividends	258,684	150,088

Includes reserves for renewals and absolescence in 1921, $75,780; in 1920, $78,587.

Southern California Edison Co.

Month of March.	1921.	1920.
Gross earnings	$1,126,487.13	$ 866,470.31
Expenses and taxes	415,482.50	359,602.44
Net earnings	711,004.53	506,867.87
Fixed charges	283,034.83	263,237.40
Balance	427,969.70	243,630.47
12 mo. ending March 31, 1921.		
Gross earnings	15,539,157.91	10,906,893.98
Expenses and taxes	6,546,584.93	4,869,294.62
Net earnings	8,992,572.98	6,037,599.36
Fixed charges	3,245,393.45	3,064,633.27
Balance	5,747,179.53	2,972,966.09

Consumers Power Co. and Michigan Light Co.

	1921	1920
March gross	$1,163,049	$1,167,067
Net after taxes	481,368	400,638
Surplus after fixed charges	296,358	225,771
Balance after preferred dividends	227,702	161,340
12 mo. gross	14,359,301	12,153,169
Net after taxes	4,639,867	4,340,356
Surplus after fixed charges	2,442,485	2,626,454
Balance after preferred dividends	1,650,016	1,854,820

United Gas & Electric Corp. Subsidiaries.

	1921.	1920.
March gross	$1,051,922	$1,014,234
Net after taxes	308,766	319,568
Total income	331,590	337,601
Surplus after charges	108,701	121,479
12 mo. gross	12,315,347	10,792,264
Net after taxes	3,607,228	3,706,274
Total income	3,902,427	3,925,656
Surplus after charges	1,355,390	1,574,835

Appalachian Power Co.

	1921.	1920.
March gross	$ 189,804	$ 153,535
Net after taxes	85,389	81,163
Total income	86,556	81,163
Surplus after charges	3,305	13,298
12 mo. gross	2,387,675	1,743,895
Net after taxes	1,053,526	815,390
Total income	1,058,193	815,390
Surplus after charges	132,846	36,726
Balance after preferred dividends	108,452	36,726

Alabama Power Co.

	1921.	1920.
March gross	$ 378,822	$ 326,829
Net after taxes	210,222	184,605
12 mo. gross	4,391,595	3,187,177
Net after taxes	2,215,988	1,709,231

Dividends.

	Term.	Rate.	Payable.
Am. Tel. & Tel.	Q	2.25%	July 15
Cent. Ark. Ry. & Lt.	Q	1.75%	June 1
Cities Service com.	M	0.5%	July 1
Cities Service com. stk.	M	1.25%	July 1
Cities Service pfd.	M	0.5%	July 1
Cities Service pfd. B	M	0.5%	July 1
Fairbanks, Morse pfd	Q	1.5%	June 1
San Joaquin L. & P. pr. pfd.	Q	$1.75	June 15
San Joaquin L. & P. pfd	Q	$1.50	June 15
Southwestern P. & L. pfd.	Q	1.75%	June 1
Standard G. & El.	Q	$1	June 15
Standard G. & El., pfd	Q	2%	June 15

WEEKLY COMPARISON OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeller & Co., Rookery Bldg., Chicago.

Public Utilities.	Div rate. Per cent.	Bid May 23.	Bid May 28.
Adirondack Electric Power of Glenns Falls, common	6	10½	10½
Adirondack Electric Power of Glenns Falls, preferred	6	71½	71½
American Gas & Electric of New York, common	..	101	101½
American Gas & Electric of New York, preferred	6	39	39
American Light & Traction of New York, common	..	84	83
American Light & Traction of New York, preferred	6	82	80
American Power & Light of New York, common	4	57½	59
American Power & Light of New York, preferred	6	71½	72
American Public Utilities of Grand Rapids, common	..	7½	7
American Public Utilities of Grand Rapids, preferred	7	17½	18
American Telephone & Telegraph of New York	..	106	105
American Water Works & Elec. of New York, common	..	4	4½
American Water Works & Elec. of New York, particip	7	8	10
American Water Works & Elec. of New York, 1st preferred	..	49	50
Appalachian Power, common	..	2½	3
Appalachian Power, preferred	7	29½	30
Cities Service of New York, common	+extra	232	225
Cities Service of New York, preferred	6	66	65
Commonwealth Edison of Chicago	8	108½	108
Comm. Power, Railway & Light of Jackson, common	..	10½	10½
Comm. Power, Railway & Light of Jackson, preferred	6	30	30
Federal Light & Traction of New York, common	..	6½	6
Federal Light & Traction of New York, preferred	..	42½	41½
Northern States Power of Chicago, common	..	47½	47
Northern States Power of Chicago, preferred	ex.div.7	81	80
Pacific Gas & Electric of San Francisco, common	..	54	53
Public Service of Northern Illinois, Chicago, common	7	78	80
Public Service of Northern Illinois, Chicago, preferred	6	82	81
Standard Gas & Electric of Chicago, common	..	12	12
Standard Gas & Electric of Chicago, preferred	8	35	35
Tennessee Railway, Light & Power of Chattanooga, common	..	⅝	1
Tennessee Railway, Light & Power of Chattanooga, preferred	6	6½	6
Western Power of San Francisco common	..	27½	29
Western Union Telegraph of New York	..	88	87
Industrials—			
General Electric of Schenectady	8	136	135
Westinghouse Electric & Mfg. of Pittsburgh, common	7	47	46½